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Nursing Diagnosis in Patients with Liver Cirrhosis in Use of Feeding Tube

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Abstract

The objective was to identify the most frequent nursing diagnoses labels in patients with liver cirrhosis in use of feeding tube. A descriptive research was carried out in a Brazilian Hospital with 20 adult patients. Systematic data collection utilized the Conceptual Model of Wanda Horta, the first nurse to introduce the concept of Nursing Process in Brazil. The six phases of the nursing diagnostic reasoning proposed by Risner were used; nursing diagnoses were described according to NANDA-I taxonomy II. Patients were mainly male; half of them were middle age adults; they had an average of 12.8 nursing diagnoses labels; and the most frequent were: risk for aspiration and risk for infection. Nurses needed to develop effective skills to properly diagnose in order to provide safe care and improve patient outcomes.

Keywords

Nursing Diagnosis, Enteral Nutrition, Liver Cirrhosis

1. Introduction

Liver cirrhosis is the leading cause of chronic liver disease in developed countries. In the United States of America, liver cirrhosis results in more than 400,000 hospitalizations and in 27,000 deaths annually. In Taiwan,

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liver cirrhosis and other chronic liver diseases together are the eighth-leading cause of death overall [1]. This patient group also accounts for 75% of unplanned readmissions to the Gastroenterology and Hepatology unit in an Australian hospital [2]. In Brazil, liver cirrhosis was also the eighth-leading cause of death among men and accounted for almost 9% of hospital admissions in 2010 [3]-[6].

The prevalence of malnutrition in these patients is also a challenge, representing 20% to 90%. Malnutrition is an independent risk factor for morbidity and mortality, because it may result in several complications [7]. Therefore, patients who are unable to meet nutrient needs should be considered candidates for enteral feeding tube in order to ensure daily nutritional requirements [8]-[10].

However, the need for a feeding tube may pose patients at great risk for adverse events due to higher probability of bleeding, especially in the presence of esophageal varices, thrombocytopenia or coagulopathy [11]. Thus, it is a concern for health care team to make an accurate and timely diagnosis of such complications and the delivery of the correct treatment to safe management of patients.

Assisting people with liver cirrhosis can be a challenge for all health care professionals, especially for nurses, because these patients are frequently admitted to hospitals due to the evolution of the disease, and they can deteriorate very quickly requiring constant monitoring and surveillance [4]. Nurses need to apply appropriate clinical judgments and clinical decision-making to reduce the frequency of hospital readmissions and to give safe and qualified care. Clinical reasoning enables nurses to make complex decisions in order to improve patients' outcomes [12]. Therefore, the proper management of patients with liver cirrhosis in use of feeding tube should be the focus of all nursing care plan in order to improve symptom management, to reduce the risks associated with further decompensation, and to enhance patient safety.

Background

The constant changes in clinical status of patients with liver cirrhosis require quick and assertive decision-making. With the aim of providing qualified care, nurses have joined forces to build a body of knowledge focused on evidence-based practices to provide competent and safe care to patients with chronic conditions.

The Nursing Process (NP) is the main methodological framework for the systematic performance of professional practice, or a technological method that nurses use to foster care, and to help in documenting professional practice. Therefore, the deliberate application of NP may contribute to the quality of care, thus improving nurses visibility and professional recognition [13].

Wanda de Aguiar Horta [14], the first nurse to introduce the concept of NP in Brazil, developed a Nursing Conceptual Model based on Maslow's Theory Human Motivation [15]. This theory is based on Basic Human Needs (BHN), which is classified in five levels: physiological needs, safety, love, esteem and self-realization. In addition to Maslow's BHN, Horta adopted the classification proposed by John Mohana. Therefore, the BHN model proposed by Horta is classified into three levels: psychobiological, psychosocial, and psycho spiritual.

The Conceptual Model of Wanda Horta was used in this study because it may help nurses to collect relevant data within the framework of nursing rather than medicine. Thus, the model may assist nurses in critical thinking and give support to practitioners in outcome identification and development of nursing care plans.

Nursing diagnosis is a process of data analysis that uses clinical reasoning to determine whether nursing interventions are indicated, contributing to the quality of care and patient safety through an evidence-based practice[16] [17]. For each nursing diagnosis, nurses select the appropriate interventions suggested by the nursing intervention classification system [17] [18].

Therefore, the present study is justified by the lack of publications addressing the nursing diagnoses in clinical patients with liver cirrhosis in Brazil and worldwide. Several studies identified the most frequent nursing diagnoses in different populations [19]-[21], but none inpatients with liver cirrhosis. Thus the purpose of this study was to identify the most frequent nursing diagnoses labels in patients with liver cirrhosis in use of feeding tube.

2. Method

2.1. Design

A descriptive research design.

2.2. Setting and Sample

The study was carried out in a Brazilian University Hospital, in São Paulo state, from January 2013 to December

2013. Participants consisted of a convenient sample of 20 adult patients with liver cirrhosis in use of feeding tube. Patients in use of percutaneous enteral feeding tubes were excluded. Unconscious patients or patients with cognitive impairment were included in the study after their family's written consent.

The study was approved by the appropriate ethics committee. Patients and/or their families were assured that their identity would remain confidential and they signed a consent form voluntarily.

2.3. Data Collection

A systematic data collection was conducted and it included interaction, observation, and measurement. Data was also collected from other resources, including family and significant others, medical records, results of diagnostic tests, nursing notes, change of shift reports, and health team members. The tool used for data collection was developed by the investigators and it was based on the Conceptual Model of Wanda Horta [22].

2.4. Data Analysis and Rigor

The guidelines proposed by Risner [23] was followed for the diagnostic reasoning, which included six phases for analysis and synthesis of data:

1) Relevant patients' data were categorized. In this study the Conceptual Model of Wanda Horta [14] was used with the aim of revealing relationships among cues, thus making missing data more obvious;
2) Missing information and incongruence were identified to indicate areas for further assessment;
3) Related cues were clustered into patterns to combine patients' elements into a whole, with the aim of constructing patterns containing information about patients' response to an actual or potential health problem, and the factors related to the response;
4) Patients' patterns were then compared with normal ranges, values, expectations, and patient baseline information to identify their health-related responses;
5) Based on patients' responses, inferences were made about their health status, condition, or situation in each of the assessment categories;
6) Finally, etiological relationships were proposed to identify factors influencing or contributing to the patients' responses.

After analysis and synthesis of all patients' relevant data, the nursing diagnosis was described according to NANDA-I taxonomy II [17], that has three levels: domains, classes, and diagnoses. All nursing diagnoses were analyzed and discussed with a panel of three nurses with experience on the Conceptual Model of Wanda Horta and on NANDA-I taxonomy II. The domains and classes of each nursing diagnosis label were also identified.

3. Results

The study sample consisted of 20 hospitalized patients with liver cirrhosis in use of feeding tube. From those, 6 (30%) were females and 14 (70%) were males, with an average age of 56.3 and 59.7, respectively. The age range was from 28 to 81 years, and almost half (n = 11) of the patients were middle age adults (from 41 to 64 years).The most common causes of liver cirrhosis were chronic alcoholism (10, 50%), followed by other etiologies (6, 30%), and viral infection (4, 20%). All patients had other comorbidities, including arterial hypertension, diabetes mellitus, or renal disease.

At hospital admission, patients presented common complications related to liver cirrhosis: hepatic encephalopathy (7, 35%); previous gastrointestinal hemorrhage and spontaneous bacterial peritonitis (6, 30% each); severe weight loss (5, 25%); ascites, esophageal varices, and hepatopulmonary syndrome (3, 15% each); and portal hypertension (2, 10%) (**Table 1**).

From the analysis and synthesis of patients' relevant data, there were 255 nursing diagnoses labels identified. Each patient had an average of 12.8 nursing diagnoses with a minimum of 9 to maximum of 16; 36 different nursing diagnoses labels were identified in the sample and 12 nursing diagnoses labels showed percentage equal to or greater than 50%.

The most frequent domains for these patients were: Domain 4—Activity/Rest (11, 30.6%) and Domain 11—Safety/Protection (10, 27.8%), followed by Domain 3—Elimination and Exchange (5, 13.9%) and Domain 2—Nutrition (4, 11.1%). No diagnoses were identified from Domain 1—Health Promotion, Domain 6—Self Perception, Domain 7—Role Relationships, Domain 8—Sexuality, and Domain 10—Life Principles.

Table 1. Sample and characteristics, according to gender (N = 20).

Variables	Female		Male		Total	
	n	%	n	%	n	%
Age Range						
28 - 40	1	5%	1	5%	2	10%
41 - 64	4	20%	7	35%	11	55%
65 - 74	0	0%	5	25%	5	25%
75 - 81	1	5%	1	5%	2	10%
Causes of cirrhosis						
Chronic alcoholism	1	5%	9	45%	10	50%
Other etiologies	3	15%	3	15%	6	30%
Viral infection	2	10%	2	10%	4	20%
Complications						
Encephalopathy	2	10%	5	25%	7	35%
Hemorrhage	1	5%	5	25%	6	30%
Peritonitis	1	5%	5	25%	6	30%
Severe weight loss	1	5%	4	20%	5	25%
Ascites	0	0%	3	15%	3	15%
Esophageal varices	1	5%	2	10%	3	15%
Hepatopulmonary syndrome	0	0%	3	15%	3	15%
Portal hypertension	0	0%	2	10%	2	10%

Analysis of the class level of the nursing diagnosis identified in the sample, Physical injury (7, 19.4%), Self-care (4, 11.1%), and Gastrointestinal function (4, 11.1%) were the most frequent. **Table 2** shows the domains, classes, and NANDA-I diagnoses labels for patients hospitalized with liver cirrhosis in use of feeding tube.

4. Discussion

Results showed a total of 255 nursing diagnoses labels, with an average of 12.8 nursing diagnoses labels per patient, and 36 different nursing diagnoses labels. The results differ from previous study conducted in an intensive care unit where 1.087 nursing diagnoses were formulated for 44 critical patients, with a mean of 8.5 diagnoses per patient, and 28 different nursing diagnoses labels [24]. Differences may be due to the methodology used in both studies for data collection and analysis.

Risk for aspiration (00039) and Risk for infection (00004) were the most frequent NANDA-I diagnoses labels found in this study. They were presented in 100% of patients. Similar findings were detected by other authors in critical patients [25] [26].

Risk for aspiration (00039) is common in patients in use of feeding tube, especially in those with chronic liver disease and portal hypertension because they have delayed gastric emptying for both the liquid and solid components [27]. In addition, the cirrhosis of the liver does not allow the free passage of blood that accumulates in the gastrointestinal tract and in the spleen, resulting in chronic congestion in this area. Consequently, indigestion due to intra-abdominal pressure and altered bowel function occur [28].

According to Opilla [29], the presence of a feeding tube also increases secretions from tube irritation, impairment of laryngeal function, and disruption of the esophageal sphincters during intubation, thus contributing to the risk for aspiration. It is worth to note that many patients in this study (25%) also had liver encephalopathy. The decreased level of consciousness in these patients and the altered coordination between breathing and swallowing interferes with the patient's ability to protect the airway [30].

Risk for infection (00004) was also presented in all patients in this study. Bacterial infections are a major complication of liver cirrhosis and a serious burden among patients because they may be a triggering factor for the occurrence of gastrointestinal bleeding, hepatic encephalopathy, kidney failure, and further deteriorate liver

Table 2. Domain, classes and NANDA-I diagnosis labels for hospitalized patients in use of feeding tube.

Domain	n	%	Class	n	%	NANDA-I label	n	%
2 - Nutrition	4	11.1	1 - Ingestion	1	2.8	Imbalanced nutrition: less than body requirements (00002)	12	60
			4 - Metabolism	1	2.8	Risk for unstable blood glucose level (00179)	3	15
			5 - Hydration	2	5.5	Excess fluid volume (00026)	12	60
						Risk for imbalanced fluid volume (00025)	1	5
3 - Elimination and exchange	5	13.9	2 - Gastrointestinal function	4	11.1	Risk for constipation (00015)	11	55
						Dysfunctional gastrointestinal motility (00196)	11	55
						Diarrhea (00013)	3	15
						Constipation (00011)	1	5
			4 - Respiratory function	1	2.8	Impaired gas exchange (00030)	2	10
4 - Activity/rest	11	30.6	1 - Sleep/rest	1	2.8	Disturbed sleep pattern (00198)	5	25
						Impaired bed mobility (00091)	8	40
			2 - Activity/exercise	3	8.3	Impaired physical mobility (00085)	3	15
						Impaired walking (00088)	2	10
			3 - Energy balance	1	2.8	Fatigue (00093)	6	30
			4 - Cardiovascular/ pulmonary response	2	5.5	Activity intolerance (00092)	1	5
						Impaired spontaneous ventilation (00033)	1	5
			5 - Self-care	4	11.1	Bathing self-care deficit (00108)	18	90
						Dressing self-care deficit (00109)	17	85.5
						Toileting self-care deficit (00110)	7	35.5
						Feeding self-care deficit (00102)	5	25.5
5 - Perception/cognition	2	5.5	4 - Cognition	2	5.5	Risk for acute confusion (00173)	15	75
						Acute confusion (00128)	5	25
9 - Coping/stress tolerance	2	5.5	2 - Coping responses	2	5.5	Ineffective coping (00069)	2	10
						Anxiety (00146)	2	10
11 - Safety/protection	10	27.8	1 - Infection	1	2.8	Risk for infection (00004)	20	100
			2 - Physical injury	7	19.4	Risk for aspiration (00039)	20	100
						Risk for bleeding (00206)	17	85
						Risk for impaired skin integrity (00047)	16	80
						Risk for falls (00155)	14	70
						Impaired skin integrity (00046)	3	15
						Ineffective airway clearance (00031)	3	15
						Impaired oral mucous membrane (00045)	2	10
			3 - Violence	1	2.8	Risk for suicide (00150)	1	5
			6 - Thermoregulation	1	2.8	Hyperthermia (00007)	1	5
12 - Comfort	2	5.5	1 - Physical comfort	2	5.6	Acute pain (00132)	1	5
						Chronic pain (00133)	1	5

function [31]. Most of the infections in cirrhotic patients are caused by enteric bacteria, accounting for approximately 32% - 34%. This suggests that the defense mechanisms of patients with chronic liver disease fail to prevent the microorganisms present in the intestinal lumen from reaching the systemic circulation, contributing to the risk of spontaneous bacterial peritonitis[4] [28] [32] [33]. Thus, nurses need to act towards the reduction of the negative clinical impact of infections in these patients to reduce repeated hospitalizations and impaired health-related quality of life.

Another nursing diagnoses were frequent in these patients, including: Bathing self-care deficit (00108), Dressing self-care deficit (00109), Risk for bleeding (00206), Risk for impaired skin integrity (00047), Risk for acute confusion (00173), Risk for falls (00155), Imbalanced nutrition: less than body requirements (00002), and Excess fluid volume (00026). Similar results were identified in previous studies involving critical care patients and patients in chronic conditions [25] [34]. In Taiwan, physical symptoms and psychological distress, including abdominal symptoms, fatigue, fluid retention, loss of appetite, systemic symptoms, decreased attention, and bleeding, were common among patients with liver cirrhosis [35]. These NANDA-I diagnoses require from nurses the ability and skills to identify the patients' health status in order to deliver an individualized nursing care plan focused on patient safety.

Self-care deficits related to activities of daily living (eg. Bathing, dressing, feeding, and toileting) were also frequent in patients because they usually suffer from moderate-to-severe fatigue. In this study, 30% of patients presented with fatigue (00093) that can result in decreased motivation, depression, reduced physical activity, and constraints on daily life [1] [36]. Nursing interventions should focus on the maintenance of physical and psychological comfort for these patients to improve their quality of life and to reduce the risks for other injuries, such as falls.

Another potential risk for patients living with liver cirrhosis is the clinical bleeding, most frequently caused by esophageal varices, gastric varices or portal hypertensive gastropathy. In this study, 15% of patients presented esophageal varices and 10% presented portal hypertension at the hospital admission. In chronic liver disease, vitamin K absorption by the liver is decreased. Therefore, the production of coagulation factors (such as II, VII, IX, and X) does not happen, resulting in prolonged time required for a blood sample to clot [4]. Moreover, hospitalized patients with liver cirrhosis require frequent invasive procedures (e.g., peripheral venous catheter for transfusions and the administration of medications and other solutions; venous and arterial puncture for blood samplings; and paracentesis), which may cause complications such as bleeding.

Thrombocytopenia is also a common and persistent problem in cirrhotic patients [7]. In this study, 30% of patients had previous gastrointestinal hemorrhage at the hospital admission, thus the risk for another hemorrhage is real. Variceal bleeding may cause upper gastrointestinal hemorrhage due to portal hypertension. It remains one of the most important complications of chronic liver disease and one of the largest causes of mortality in this group [2] [37]. These patients have a permanent state of hyperdynamic circulation, with pronounced splanchnic vasodilatation. Further bleeding can occur in 60% of patients, with a mortality of up to 33%. Prevention of bleeding is therefore an essential part of the management of these patients [38]. However, the management of patients with acute gastrointestinal bleeding includes not only treatment and control of active bleeding but also the prevention of further bleeding, infections, and renal failure [39].

It is worth to note that 70% of patients had Risk for falls (00155), 35% were elderly, and 25% had Acute confusion (00128). The liver's inability to detoxify the blood results in increased blood circulation of ammonia and other toxic metabolites [4]. The increased concentration of ammonia in the blood causes brain dysfunction and injury, contributing to the hepatic encephalopathy. In the first stage of the hepatic encephalopathy, patients may experience discrete mental changes, as well as motor disorders. As the problem persists, patients may demonstrate mental confusion, mood swings, and sleep pattern changes. All these manifestations, when present, increase the risk for falling. In addition, the incidence of falls in patients over 60 years is almost three times higher than in older adults [40].

Imbalanced nutrition: less than body requirements (00002) was also frequent in these patients (60%). These results differ from those found by Park [41] in patients with heart failure. According to the author, Imbalanced nutrition: less than body requirements (00002) was detected only in 2.7% of patients. Researchers [26] [24] also found different results in intensive care units. In both studies, Imbalanced nutrition: less than body requirements (00002) was detected in 5% of patients. The results differ from the others, perhaps because of patients profile comprising the samples. It is worth to consider that malnutrition is prevalent in patients with liver cirrhosis because the evolution of the disease. According to Tai *et al*. [9] malnutrition was present in 50% of Malaysian pa-

tients and the mean caloric intake was low at 15.2 kcal/kg/day. Thus, patients with end stage hepatic failure will present with muscle wasting, decreased fat stores, and overt cachexia [42].

Excess fluid volume (00026) is another common complication in patients with liver cirrhosis because the synthesis of proteins, such as albumin, is impaired. This nursing diagnosis was detected in 60% of all patients. Vargas and França [43] found Excess fluid volume (00026) in a case study conducted in a Brazilian hospital with a patient with liver cirrhosis. Hypoalbuminemia decreases the plasma oncotic pressure deflecting the balance of hemodynamic forces to the accumulation of fluid in interstitial spaces, thus resulting in peripheral edema and ascites. In addition, the liver failure to metabolize aldosterone resulting in increased retention of sodium and water by the kidneys, and in increased potassium excretion [44]. As the problem persists, the retention of sodium and water contributes to the increased blood volume that may cause cardiac overload and hence pulmonary edema.

In relation to the most prevalent NANDA-I domain found in this study, the results were similar to those identified by Park [41] in patients with heart failure. The author also found Physical injury as the most frequently used NANDA-I class in this population. In one study conducted with liver transplant patients, researchers [45] found that the domains mostly affected by patients were activity/rest, safety/protection, elimination and exchange, and comfort. Thus, it is important to identify the specific interventions commonly delivered for specified groups of patients [46] in order to improve patient outcomes and deliver safe care.

Liver cirrhosis is a progressive illness that may culminate in multiple system organ failure and death [47], requiring appropriate health care management, especially from nurses that should act in order to prevent further complications and to improve patient outcomes.

The results of this study sustain that nursing diagnoses should be seen as the basis for independent and collaborative actions because they provide direction for nursing interventions. Thus, nurses need to list nursing diagnoses during the process of care to reflect patients' changing condition and responses in order to individualize patient care.

Limitations

This study presented limitations. Nursing diagnoses labels were identified only in hospitalized patients. In addition, only 20 patients participated in this research, thus future studies should be conducted in multiple healthcare settings, such as ambulatory care, and with larger samples.

5. Conclusion

The most frequent nursing diagnoses labels identified in patients with liver cirrhosis in use of feeding tube were Risk for aspiration (00039) and Risk for infection (00004), requiring from nurses appropriate management of complications. This was the first research conducted in a practice setting with patients with liver cirrhosis. These findings supported that the identification of the most frequent nursing diagnoses in specific population helped nurses to identify the focus of care in patients with complex health problems and to prevent future complications associated with the evolution of disease.

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Authors' Contribution

Gimenes F.R.E. contributed to the project design, development of research, data collection, analysis and interpretation of data, writing, critical review of the relevant intellectual content and final approval of the version to be published. Silva P.C.S., Lopes A.R., and Reis R.K. contributed to data analysis, writing, critical review of the relevant intellectual content and final approval of the version to be published. Shasanmi R. made contributions to revisions of article for intellectual content and English language. Campos E.C. made substantial contributions to drafting of the article, and revised the article for important intellectual content.

References

[1] Wu, L.-J., Wu, M.-S., Lien, G.I.S., Chen, F.-C. and Tsai, J.-C. (2012) Fatigue and Physical Activity Levels in Patients

with Liver Cirrhosis. *Journal of Clinical Nursing*, **21**, 129-138. http://dx.doi.org/10.1111/j.1365-2702.2011.03900.x

[2] Wigg, A.J., McCormick, R., Wundke, R. and Woodman, R.J. (2013) Efficacy of a Chronic Disease Management Model for Patients with Chronic Liver Failure. *Clinical Gastroenterology and Hepatology*, **11**, 850-858. http://dx.doi.org/10.1016/j.cgh.2013.01.014

[3] Ministry of Health (2008) [Brazil's Health 2007: An Analysis of the Health Situation]. Ministry of Health, Brasília, 641 p.

[4] Kelso, L.A. (2008) Cirrhosis: Caring for Patients with End-Stage Liver Failure. *The Nurse Practitioner*, **33**, 24-30. http://dx.doi.org/10.1097/01.NPR.0000325976.85753.dd

[5] Silva, I.S.S. (2010) [Liver Cirrhosis]. *Revista Brasileira de Medicina*, **67**, 9.

[6] Barros, M.B.A., Francisco, P.M.S.B., Zanchetta, L.M. and César, C.L.G. (2011) [Trends in Social and Demographic Inequalities in the Prevalence of Chronic Diseases in Brazil. PNAD: 2003-2008]. *Ciência & Saúde Coletiva*, **16**, 3755-3768. http://dx.doi.org/10.1590/S1413-81232011001000012

[7] Marsano, L.S., Mendez, C., Hill, D., Barve, S. and McClain, C.J. (2003) Diagnosis and Treatment of Alcoholic Liver Disease and Its Complications. *Alcohol Research and Health*, **27**, 247-256.

[8] Saunders, J., Brian, A., Wright, M. and Stroud, M. (2010) Malnutrition and Nutrition Support in Patients with Liver Disease. *Frontline Gastroenterology*, **1**, 105-111. http://dx.doi.org/10.1136/fg.2009.000414

[9] Tai, M.-L., Goh, K.-L., Mohd-Taib, S., Rampal, S. and Mahadeva, S. (2010) Anthropometric, Biochemical and Clinical Assessment of Malnutrition in Malaysian Patients with Advanced Cirrhosis. *Nutrition Journal*, **9**, 27. http://dx.doi.org/10.1186/1475-2891-9-27

[10] O'Brien, A. and Williams, R. (2008) Nutrition in End-Stage Liver Disease: Principles and Practice. *Gastroenterology*, **134**, 1729-1740. http://dx.doi.org/10.1053/j.gastro.2008.02.001

[11] Andus, T. (2007) ESPEN Guidelines on Enteral Nutrition: Liver Disease—Tube Feeding (TF) in Patients with Esophageal Varices Is Not Proven to Be Safe. *Clinical Nutrition*, **26**, 272. http://dx.doi.org/10.1016/j.clnu.2006.12.005

[12] Simmons, B. (2010) Clinical Reasoning: Concept Analysis. *Journal of Advanced Nursing*, **66**, 1151-1158. http://dx.doi.org/10.1111/j.1365-2648.2010.05262.x

[13] Garcia, T.R. and Nóbrega, M.M.L. (2009) [Nursing Process: From Theory to the Practice of Care and Research]. *Escola Anna Nery Revista de Enfermagem*, **13**, 188-193.

[14] Horta, W.A. (1979) [Nursing Process]. EPU, São Paulo.

[15] Maslow, A.H. (1943) A Theory of Human Motivation. *Psychological Review*, **50**, 370-396. http://dx.doi.org/10.1037/h0054346

[16] Doenges, M.E. and Moorhouse, M.F. (2012) Application of Nursing Process and Nursing Diagnosis: An Interactive Text for Diagnostic Reasoning. F.A. Davis, Philadelphia.

[17] NANDA International Inc (2012) Nursing Diagnoses: Definitions and Classification. Wiley-Blackwell, Oxford.

[18] Bakken, S., Silveira, D., Gerhardt, L., Dal Sasso, G. and Barbosa, S. (2011) [Systems Decision Support and Patient Safety]. In: Cometto, M., Gómez, P., Dal Sasso, G., Grajales, R., Cassiani, S. and Morales, C., Eds., *Nursing and Patient Safety*, Organização Panamericana de Saúde, Washington, 387-397.

[19] Scherb, C.A., Head, B.J., Maas, M.L., Swanson, E.A., Moorhead, S., Reed, D., Conley, D.M. and Kozel, M. (2011) Frequent Nursing Diagnoses, Nursing Interventions, and Nursing-Sensitive Patient Outcomes of Hospitalized Older Adults with Heart Failure: Part 1. *International Journal of Nursing Terminologies and Classifications*, **22**, 13-22. http://dx.doi.org/10.1111/j.1744-618X.2010.01164.x

[20] Ouslander, J.G., Diaz, S., Hain, D. and Tappen, R. (2011) Frequency and Diagnoses Associated with 7- and 30-Day Readmission of Skilled Nursing Facility Patients to a Nonteaching Community Hospital. *Journal of the American Medical Directors Association*, **12**, 195-203. http://dx.doi.org/10.1016/j.jamda.2010.02.015

[21] Souza, C.C., Mata, L.R.F., Carvalho, E.C. and Chianca, T.C.M. (2013) [Nursing Diagnoses in Patients Classified as Priority Level I and II according to the Manchester Protocol]. *Revista da Escola de Enfermagem da USP*, **47**, 1318-1324. http://dx.doi.org/10.1590/S0080-623420130000600010

[22] Gimenes, F.R.E., Reis, R.K., Silva, P.C.S., Silva, A.E.B.C. and Atila, E. (2015) Nursing Assessment Tool for People with Liver Cirrhosis. *Gastroenterology Nursing*, Publish Ahead of Print.

[23] Risner, P. (1986) Diagnosis: Analysis and Synthesis of Data. In: Griffith-Kenney, J. and Christensen, P., Eds., *Nursing Process Application of Theories*, *Frameworks*, and *Models*, 2nd Edition, Mosby, St. Louis, 124-151.

[24] Salgado, P.O. and Chianca, T.C. (2011) Identification and Mapping of the Nursing Diagnoses and Actions in an Intensive Care Unit. *Revista Latino-Americana de Enfermagem*, **19**, 928-935. http://dx.doi.org/10.1590/S0104-11692011000400011

[25] Melo, E., Albuquerque, M. and Aragão, R. (2012) Nursing Diagnosis Prevalence in Patients at an Intensive Care Unit of a Public Hospital. *Journal of Nursing UFPE Online*, **6**, 1361-1368.

[26] Chianca, T.C., Lima, A.P. and Salgado, P.O. (2012) [Nursing Diagnoses Identified in Inpatients of an Adult Intensive Care Unit]. *Revista da Escola de Enfermagem USP*, **46**, 1102-1108. http://dx.doi.org/10.1590/S0080-62342012000500010

[27] Galati, J.S., Holdeman, K.P., Dalrymple, G.V., Harrison, K.A. and Quigley, E.M. (1994) Delayed Gastric Emptying of Both the Liquid and Solid Components of a Meal in Chronic Liver Disease. *The American Journal of Gastroenterology*, **89**, 708-711.

[28] Carrola, P., Militão, I. and Presa, J. (2013) [Bacterial Infections in Patients with Liver Cirrhosis]. *GE Jornal Português de Gastrenterologia*, **20**, 58-65. http://dx.doi.org/10.1016/j.jpg.2012.09.008

[29] Opilla, M. (2003) Aspiration Risk and Enteral Feeding: A Clinical Approach. *Practical Gastroenterology*, **27**, 89-96.

[30] Metheny, N.A. (2002) Risk Factors for Aspiration. *Journal of Parenteral and Enteral Nutrition*, **26**, S26-S33. http://dx.doi.org/10.1177/014860710202600605

[31] Jalan, R., Fernandez, J., Wiest, R., Schnabl, B., Moreau, R., Angeli, P., Stadlbauer, V., Thierry, G.T., Bernardi, M., Canton, R., Agustin Albillos, A., Lammert, F., Wilmer, A., Mookerjee, R., Vila, J., Garcia-Martinez, R., Wendon, J., Such, J., Cordoba, J., Sanyal, A., Garcia-Tsao, G., Arroyo, V., Burroughs, A. and Gines, P. (2014) Bacterial Infections in Cirrhosis. A Position Statement Based on the EASL Special Conference 2013, *Journal of Hepatology*, 60, 1310-1324. http://dx.doi.org/10.1016/j.jhep.2014.01.024

[32] Merli, M., Lucidi, C., Giannelli, V., Giusto, M., Riggio, O., Falcone, M., Ridola, L., Attili, A.F. and Venditti, M. (2010) Cirrhotic Patients Are at Risk for Health Care-Associated Bacterial Infections. *Clinical Gastroenterology and Hepatology*, **8**, 979.e1-985.e1. http://dx.doi.org/10.1016/j.cgh.2010.06.024

[33] Wong, F., Bernardi, M., Balk, R., Christman, B., Moreau, R., Garcia-Tsao, G., Patch, D., Soriano, G., Hoefs, J. and Navasa, M. (2005) Sepsis in Cirrhosis: Report on the 7th Meeting of the International Ascites Club. *Gut*, **54**, 718-725. http://dx.doi.org/10.1136/gut.2004.038679

[34] Almeida, M.A., Aliti, G.B., Franzen, E., Thomé, E.G.R., Unicovsky, M.R., Rabelo, E.R., Ludwig, M.L.M. and Moraes, M.A. (2008) Prevalent Nursing Diagnoses and Interventions in the Hospitalized Elder Care. *Revista Latino-Americana de Enfermagem*, **16**, 707-711. http://dx.doi.org/10.1590/S0104-11692008000400009

[35] Tsai, L.-H., Lin, C.-M., Chiang, S.-C., Chen, C.-L., Lan, S.-J. and See, L.-C. (2014) Symptoms and Distress among Patients with Liver Cirrhosis but without Hepatocellular Carcinoma in Taiwan. *Gastroenterology Nursing*, **37**, 49-59. http://dx.doi.org/10.1097/SGA.0000000000000020

[36] Swain, M.G. (2006) Fatigue in Liver Disease: Pathophysiology and Clinical Management. *Canadian Journal of Gastroenterology*, **20**, 181-188. http://dx.doi.org/10.1155/2006/624832

[37] Hearnshaw, S.A., Logan, R.F., Lowe, D., Travis, S.P., Murphy, M.F. and Palmer, K.R. (2011) Acute Upper Gastrointestinal Bleeding in the UK: Patient Characteristics, Diagnoses and Outcomes in the 2007 UK Audit. *Gut*, **60**, 1327-1335. http://dx.doi.org/10.1136/gut.2010.228437

[38] Bari, K. and Garcia-Tsao, G. (2012) Treatment of Portal Hypertension. *World Journal of Gastroenterology*, **18**, 1166-1175. http://dx.doi.org/10.3748/wjg.v18.i11.1166

[39] Biecker, E. (2013) Gastrointestinal Bleeding in Cirrhotic Patients with Portal Hypertension. *ISRN Hepatology*, **2013**, Article ID: 541836. http://dx.doi.org/10.1155/2013/541836

[40] Sales, M.V.C., Silva, T.J.A., Gil Jr., L.A. and Filho, W.J. (2010) Adverse Events of Hospitalization for the Elderly Patient. *Geriatria & Gerontologia*, **4**, 238-246.

[41] Park, H. (2014) Identifying Core NANDA-I Nursing Diagnoses, NIC Interventions, NOC Outcomes, and NNN Linkages for Heart Failure. *International Journal of Nursing Knowledge*, **25**, 30-38. http://dx.doi.org/10.1111/2047-3095.12010

[42] Krenitsky, J. (2003) Nutrition for Patients with Hepatic. Nutrition Issues in Gastroenterology, *Practical Gastroenterology*, **6**, 23-42.

[43] Vargas, R.S. and França, F.C.V. (2007) [Implementation of the Nursing Process in a Patient with Hepatic Cirrhosis Using the Standardized Terminologies NANDA, NIC and NOC]. *Revista Brasileira de Enfermagem*, **60**, 348-352. http://dx.doi.org/10.1590/S0034-71672007000300020

[44] Brunner, L.S., Smeltzer, S.C.O.C., Bare, B.G., Hinkle, J.L. and Cheever, K.H. (2010) Brunner & Suddarth's Textbook of Medical-surgical Nursing. Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia.

[45] Carvalho, D.V., Salviano, M.E.M., Carneiro, R.A. and Santos, F.M.M. (2007) [Nursing Diagnosis of Post Surgical Patients of Liver Transplantation by Alcoholic and Non Alcoholic Cirrhosis]. *Escola Anna Nery*, **11**, 682-687. http://dx.doi.org/10.1590/S1414-81452007000400020

[46] Park, H. (2010) NANDA-I, NOC, and NIC Linkages in Nursing Care Plans for Hospitalized Patients with Congestive Heart Failure. PhD Dissertation, Univerity of Iowa, Iowa.

[47] Olson, J.C. and Kamath, P.S. (2012) Acute-On-Chronic Liver Failure: What Are the Implications? *Current Gastroenterology Report*, **14**, 63-66. http://dx.doi.org/10.1007/s11894-011-0228-2

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The Effects of Aroma Hand Massage on Fatigue and Sleeping among Hospice Patients

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Abstract

Purpose: The purpose of this study was the comparative effects on fatigue and sleep of aroma hand massage vs. hand massage among hospice patients in a hospital. Methods: The design of this study was a nonequivalent comparison group pretest-posttest design. This study was performed from May to December 2012 in a hospice ward. A total of 30 hospice patients in a hospice ward participated in the study (17 in an aroma massage group and 13 in a massage group). The Piper Fatigue Scale was used to measure the fatigue level. The quantity of sleep was measured using sleep hours and the quality of sleep using the Verran & Snyder-Halpern sleep scale (1987). The aroma massage group used 1:1 lavender and bergamot diluted to 1% with 100 ml jojoba carrier oil. The massage group used carrier oil without an essential oil. Each treatment was performed for 10 minutes prior to the subject's sleeping time, once a day and for 5 days. Data were analyzed using t-test, x^2-test, Fisher's exact test and the repeated measures ANOVA with the SPSS program. Results: The increase in the fatigue and decrease in the sleep quantity were lower in the aroma hand massage compared to the only hand massage but they were not statistically significant. Conclusion: The quality of sleeping improved in the aroma hand massage group compared to the control group even though it was not significant. For the further studies, assessing and respecting the patient's aroma preference were important considerations when providing aromatherapy and the appropriation of using 1% essential oil to dilute needs to be tested for the hospice patients in the further studies

Keywords

Hospices, Aromatherapy, Fatigue, Sleep

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1. Introduction

Hospice care provides supportive care to terminally ill clients and the focus of care is on giving comfort to the patient and improving the quality of life rather than cure [1]. The goal of hospice care is to enable patients to be comfortable and pain free so that they live each day as fully as possible [1]. With the increase in the number of older adults and cancer patients, the number of hospice clients had increased to 71,579 in South Korea in 2011 which was a 21.4% increase from 2000 [2]. In addition, the number of hospice clients in hospice wards has also increased because hospice care including end of life care in the past is given by families or relatives in the clients' home in South Korea, but is being largely provided in hospice wards in hospitals [3].

Hospice clients experience diverse health problems including physical and emotional problems such as pain, anger, anxiety, helplessness and depression, and they also suffer from the monetary burden of medical expenses [3]. For these reasons, hospice clients show physical and emotional symptoms and the symptoms are usually related to severe fatigue and a low quality of sleeping [4]. Fatigue is defined as a subjective state in which one feels tired or exhausted and is related to disturbances, depressive symptoms, paralyzed status and restlessness [5]. Especially, fatigue in cancer patients is related to weight change, ADL status, pain, immobility, sleeping [6] [7].

Sleeping is a necessary factor for normal activity and is related to well-being and the quality of life. Sleeping is related to the low education level, poor economic status, no religion, no spouse, no exercise, low perceived health condition, bad perceived family relationship [8] [9]. An appropriate level of sleeping improves tissue restoration, functions of immune system, emotional functions and the quality of life [10]. However, sleeping disturbances are general symptoms occurring in hospice patients and they produce negative effects including physical and emotional problems. Sleeping disorder is a risk factor for fatigue, anxiety and depression and eventually causes weakness, isolation and sense of loss [10].

Because fatigue and sleeping disturbances are serious problems for hospice clients, many non-pharmacological interventions are used to improve the problems, including music intervention, aromatherapy, horticulture therapy and image therapy [11]-[13]. Of these interventions, aromatherapy is defined as the "use of essential oils for therapeutic purposes that encompass mind, body, and spirit" [14] and it is the therapeutic use of essential oils derived from plants and these oils can be absorbed into the body via the skin or the olfactory system [15]. Each essential oil acts as olfactory stimulants via the olfactory bulb to the limbic system of the brain which includes the amygdala and the hippocampus [16]. The amygdala governs emotional responses and the hippocampus involves in the retrieval of explicit memories. Aroma therapy is an appropriate non-pharmacological intervention for hospice clients because it is non-invasive and easy to provide.

The previous studies have reported the positive effects of aromatherapy in alleviating physical problems such as pain and in the improvement of daily activities, but additionally, amelioration of emotional problems such as depression and anxiety have been described [17] [18] as well. However, studies to investigate the effect of aroma therapy focused on elderly inpatients, hemodialysis patients or painful patients in Korea [19]-[21]. In addition, these studies were limited to other health problems more than fatigue and sleeping [11] [22].

Because fatigue and sleeping problems are significantly related with well-being and the quality of life in hospice clients, it is very important to decrease clients' fatigue levels and improve their sleep. In addition, many studies related to aromatherapy offered interventions only once or measured the immediate effects [22] [23]. In addition, Halcon and Buckle (2006) [16] reported the essential oils are absorbed through the skin by diffusion and massage also can facilitate absorption of essential oils so that aromatherapy using massage can enhance the effects of interventions [16]. Therefore, there is a need to test the repeated use of an aromatherapy with massage and to test the long term effects on fatigue and sleeping. The findings of this study would therefore provide meaningful data for the provision of aromatherapy to hospice clients.

The present study compared the effects of aroma hand massage with only hand massage on fatigue and sleeping for hospice patients in a hospital, with the aim of suggesting practical nursing interventions to improve fatigue and sleep: 1) Subjects participating in aroma hand massage group(experimental group) will experience a lower level of fatigue, as compared to the hand massage group(comparison group) and 2) Subjects participating in the experimental group will experience better sleep compared to the comparison group.

2. Methods

2.1. Research Design

This study was of nonequivalent pretest-posttest design to compare the effects of aroma massage group with

only massage group on fatigue and sleeping for hospice patients in a hospice ward.

2.2. Sample and Settings

A total of 30 subjects (17 in the experimental group and 13 in the comparison group) had participated in this study. Inclusion criteria of the study were 1) diagnosed as a hospice patient; 2) not having any kind of allergy to aroma oils; 3) not having lesions on both hands; 4) being able to understand the questionnaires and communicate verbally; 5) consent given to participate in the study; 6) having families who agreed to participate in the study.

Originally, the first 18 subjects were assigned into the experimental group and the next 18 to the control group accordingly but 2 subjects in the control group expired right after the assignment so a total of 34 subjects participated in the study (18 in the experimental group and 16 in comparison group). During the research period, 1 client in the experimental group and 3 in the comparison group dropped from the study for reasons such as death (2), mental deterioration (1) and reluctance to smell the aroma odor (1). In the end, there were 17 clients in the experimental group and 13 clients in the comparison group who completed the study. Based on the G*Power 3 Program analysis [24] for repeated measures ANOVA (with medium effect 0.25; power 0.75; and alpha value 0.05), a minimum sample size for each group was set as 15 and the number of subjects in this study satisfied the minimum sample size.

2.3. Measurements

2.3.1. Fatigue

The Piper Fatigue Scale developed by Piper *et al*. (1998) [25] and translated by Sohn (2002) [26] was used to measure the level of fatigue. The questionnaire includes a total of 22 questions in 4 areas (behavioral/severity area: 6 questions; affective meaning area: 5 questions; sensory area: 5 questions; cognitive/mood area: 6 questions) [25]. The Visual Analogue Scale (VAS) from 0 to 10 points was used for each question. A higher score in the questionnaire meant a higher level of fatigue. The Cronbach's alpha value of the questionnaire was initially 0.97 and the value in this study was set at 0.87.

2.3.2. Sleep

1) Quantity of sleep: quantity of sleep means the number of hours slept during the night from the time of going to bed to the time the subject wakes up.

2) Quality of sleep: the sleep scale was developed by Verran & Snyder-Halpern (1987) [27] [28] and translated by Kang& Kim (1994) [29]. The questionnaire includes a total of 8 questions with the Visual Analogue Scale (VAS) from 0 to 10 points. Ahigher score in the questionnaire means a higher level in the quality of sleep. The Cronbach's alpha value of the questionnaire was initially 0.82, 0.80 in Kang& Kim's study (1994) [29] and 0.76 in this study.

2.4. Data Collection

The study was approved by the D Hospital IRB committee members (IRB NO: 12 - 63) in D city, and data collection was started after the IRB approval. This study was conducted from May to December 2012 in a hospice ward. The principal investigator (PI) contacted the director of nursing, head nurses and nurses in the D-Hospital of Korea that was less than 1 hour's drive from the PI's office and explained the purpose, specific contents and procedure of the study. When they agreed to introduce the study to the hospice clients and their families, the PI visited the hospice ward to explain the study to the hospice clients and their families. When the hospice clients showed the interests to participate in this study during the hospitalization, the PI explained about the purpose of this study at clients' rooms. The PI obtained a formal consent from each of the subjects and their families when they agreed. The data collection was started when after consents were obtained. All patients and their families were informed that they were allowed to withdraw their consent at any time point if they did not want to continue the participation. The personal information of the participant was confidentially kept in the PI's office room.

Three Research Assistants (RAs) provided aroma hand massage for the experimental group and hand massage for the comparison group. The 3 RAs were nurses with working experiences at a hospice ward for >5 years and who had been trained by international aroma therapists. Before the data collection started, they were trained to provide the massage with same contents and procedures. The RAs were assigned to provide the aroma hand

massage for the experimental group and the hand massage for the comparison group in a row. For example, the RA 1 was assigned to the experimental group, the RA 2 was assigned to the comparison group, the RA 3 was assigned to the experimental group and the RA 1 was assigned to the comparison group.

The subjects' characteristics were recorded for the pre-test. The Piper Fatigue Scale [25] [26] and a sleep questionnaire using Verran & Snyder-Halpern (VSH) [27] [29] were initially measured for both groups. For the post-test, the fatigue levels were measured when the last and fifth massage had been completed and the sleep level was measured 5 times when every single massage was conducted for the both groups. Specific explanations regarding the aroma massage in the experimental group and the only massage in the comparison group were as follows.

2.5. Interventions

- Aroma hand massage (experimental group)

The way of doing the aroma massage in this study was originally developed by the Korea Aromatherapy Association (1997) [30] and the aroma massage was provided using blended oil (a mixture of lavender and bergamot essential oil in a 1:1ratio that was diluted to 1% with 100 ml jojoba carrier oil). The aroma hand massage was performed for 10 minutes (5 minutes for each hand) right before the sleeping time for 5 consecutive days (a total of 5 times for each subject; once a day). Lavender and bergamot essential oils were used in this study because essential oils were found to make clients relaxed in previous studies [15] [21].

The oil was blended to 1% in this study because essential oil diluted to 1% was used in the previous studies for cancer patients [31] [32]. The aroma hand massage was performed at 9 ~ 10 pm because the hospice clients in this study went to sleep at around 10 pm. The hand aroma massage was applied for a period of 5 minutes for each hand and the duration of massage was chosen based on findings of previous studies that nursing interventions longer than 10 minutes increased the fatigue in hospice clients.

The aroma hand massage was offered for a total of 5 times for 5 consecutive days because hospice clients usually stay in a hospice ward for less than 7 days in South Korea and because it was difficult to communicate with the subjects as they approached the end of their life, even though a hand aroma massage had been provided for many days for other kinds of patients.

The specific procedure of aroma hand massage provided in this study was as follows:

1) Drop 3 - 5 mL of oil into both hands, rub the hands lightly and apply the oil to the clients' hands.
2) Make a circle by pressing with your two thumbs on a client's wrist.
3) Gently press the client's palm with your two thumbs.
4) Make a circle by pressing with your fist on the client's palm.
5) Help the client's arm stretch to each side with your hands.
6) Tendon work: pressing and pulling the middle part of the client's metacarpal with your fingers.
7) Press each finger of the client with your thumb and direction finger.
8) Put your fingers between the client's joints and pull your fingers back by pressing.
9) Wrap the client's hands up with both your palms and pull the client's hands gently.

2.6. Hand Massage (Comparison Group)

Only hand massage without any type of aroma was offered in the comparison group and provided with only jojoba carrier oil(without essential oils)according to the massage technique of the Korea Aromatherapy Association (1997) [30]. The hand massage was given at 9 ~ 10 pm for 10 minutes (5 minutes for each hand) a total of 5 times over 5 days in the same way.

2.7. Data Analysis

Data analysis was conducted using the SPSS/WIN version 18.0 program (SPSS, Inc., an IBM Company, Chicago, llinois, USA). Descriptive statistics were used to describe the subject's characteristics. T-test, χ^2-test, Fisher's exact test, and the repeated measures ANOVA were used to test the research questions.

3. Results

Subject's characteristics were presented in **Table 1**. Over half of participants in the experimental group were

male 10 (59%), 50 - 69 years old 9 (53%), had a religion 9 (53%), were married 12 (71%) and were less than high school graduates 12 (70%). Over half of participants in the comparison group were female 7 (54%), less than 69 years old 9 (69%), had a religion 10 (77%), were married 8 (62%) and were less than high school graduates 8 (62%). Most participants in both groups had been diagnosed with cancer 11 (65%) in the experimental group and 7 (54%) in the control group, had caregivers (9 (53%) and 10 (77%)), were on their first admission at this time (13 (76%) and 9 (69%)) and admitted to pain control (10 (59%) and 7 (54%)). There were no differences in subjects' characteristics, fatigue and sleep levels between the groups at pre testing.

The study findings on fatigue were presented in **Table 2**. The fatigue level in the experimental group increased by 0.06 (from 6.03 to 6.09) and the level in the comparison group increased by 0.16 (from 6.15 to 6.31) indicating no significant difference in fatigue levels between the experimental and comparison group. The changes in the quantity of sleep in both groups were presented in **Table 3**. The quantity of sleep in the experi-

Table 1. Subject's characteristics and homogeneity test (N = 30).

Characteristics	Category	Exp. (n = 17)	Con. (n = 13)	t/x^2	*p*
		N (%) or M ± SD			
Gender	Male	10 (59)	6 (46)	0.475	0.713
	Female	7 (41)	7 (54)		
Age (years)	Less than 50	3 (18)	3 (23)	0.181	0.913
	50 - 69	9 (53)	6 (46)		
	More than 70	5 (29)	4 (31)		
	Mean	61.82 ± 12.47	61.46 ± 13.91	0.075	0.941
Religion	Yes	9 (53)	10 (77)	1.824	0.259†
	No	8 (47)	3 (23)		
Marriage	Married	12 (71)	8 (62)	0.271	0.705†
	Divorce, bereavement, separation	5 (29)	5 (38)		
Education (school)	≤Elementary	6 (35)	4 (31)	0.271	0.873
	Middle	6 (35)	4 (31)		
	≥High	5 (29)	5 (38)		
Social security	Medicaid	7 (41)	5 (38)	0.023	0.880
	Medicare	10 (59)	8 (62)		
Diagnosis	Cancer	11 (65)	7 (54)	0.362	0.547
	Other	6 (35)	6 (46)		
Caregiver	Yes	9 (53)	10 (77)	1.824	0.259†
	No	8 (47)	3 (23)		
Admission type	First admission	13 (76)	9 (69)	0.197	0.698†
	Re-admission	4 (24)	4 (31)		
Admission reason	Pain control	10 (59)	7 (54)	0.74	0.785
	Symptom control	7 (41)	6 (46)		

† = Fisher's exact test; Exp. = Experimental group; Con. = Control group.

Table 2. Fatigue between the groups (N = 23).

Groups	Pre	Post	t†	*p*	Difference (pre-post)	t††	*p*
	M (SD)				M (SD)		
Exp. (n = 13)	6.03 (1.99)	6.09 (1.81)	−0.227	0.824	−0.06 (1.00)	−0.813	0.423
Con. (n = 10)	6.15 (1.77)	6.31 (1.79)	−0.565	0.586	−0.16 (0.92)		

† = paired t-test; †† = independent t-test.

Table 3. Quantity of sleep for 7 days† (N = 30).

Time(hour)	Exp. (n = 17)			Con. (n = 13)	
	M (SD)			M (SD)	
Pretest	7.70 (2.15)			7.39 (1.45)	
Post 1 day	6.85 (1.52)			6.77 (1.88)	
Post 2 days	6.88 (1.40)			7.31 (2.18)	
Post 3 days	7.03 (1.55)			7.54 (1.28)	
Post 4 days	7.74 (1.17)			7.50 (1.68)	
Post 5 days	7.29 (1.32)			6.65 (1.31)	
Post 6 days	7.09 (0.75)			6.46 (1.05)	
Source	SS	df	MS	F	*p*
Between groups					
Groups	0.996	1	0.996	0.197	0.660
Error	141.242	28	5.044		
Within groups					
Time	20.098	4.002	5.022	1.814	0.131
Time x Groups	9.379	4.002	2.343	0.847	0.499
Error	310.183	112.065	2.768		

† = Repeated Measures ANOVA.

Table 4. Quality of sleep between the groups (N = 30).

Group	Pre test Post test		t†	*p*	Difference (pre-post)	t††	*p*
	M (SD)				M (SD)		
Exp. (n = 17)	4.65 (1.73)	4.87 (1.55)	−0.914	0.375	−0.22 (0.10)	0.481	0.634
Con. (n = 13)	4.46 (1.51)	4.61 (1.23)	−0.407	0.691	−0.15 (1.36)		

† = paired t-test; †† = independent t-test.

mental group was initially as high as 7.70 and decreased to 7.09 in 6 days. The quantity of sleep level in the comparison group was initially as high as 7.39 and decreased to 6.46 in 6 days. Repeated measures ANOVA showed that there was no significant difference in the quantity of sleep level between the groups. The quality of sleep level in both groups was presented in **Table 4**. The quality of sleep in the experimental group was initially 4.65 and increased to 4.87. The quality of sleep level in the comparison group was initially 4.46 and also increased to 4.61. But, there was no significant difference in the quality of sleep between the groups.

4. Discussion

The purpose of this study was to compare the effects of aroma hand massage with only hand massage on fatigue and sleep. The massage for both groups was provided at 9 ~ 10 pm right before bed time for a total of 10 minutes to the clients' both hands for 5 consequent days.

The findings of this study showed even though there was no significant difference in the effects of aroma hand massage with only hand massage on fatigue, the increase in the fatigue level in the aroma hand massage group was lower than the only hand massage group. The findings of the current study were partially consistent with the study of Wilcock and colleagues (2004) [33]. Wilcock and colleagues (2004) [33] compared the effect of aromatherapy with day care alone on fatigue in cancer patients at a palliative care day centre and reported no significant difference between the 2 groups. They used a blend of 1% lavender and chamomile in sweet almond carrier oil for 30 minutes weekly for a total of 4 sessions. The 2 studies showed no significant difference in fatigue between the 2 groups when provided to hospice clients. When considered hospice clients experience serious fatigue as time goes by, the slow increase in fatigue level would be meaningful to hospice clients.

On the other hand, a few studies reported that aromatherapy using lavender improved fatigue, as compared to

the control group when offered to patients with pain or hemodialysis [19] [20]. In Kang and Kim's study (2008) [19], aromatherapy was provided to improve fatigue for hemodialysis patients. The aroma hand massage was provided for 5 minutes for a total of 12 times (3 times/week for 4 weeks). The oils were a mixture of lavender, chamomile and geranium oil in the ratio of 4:4:2. The mixture was diluted to 3% with 100 ml sweet almond carrier oil. The reviewed study showed a lower fatigue level in the aroma hand massage group than in the comparison group. In addition, Kim and Kim (2009) [20] reported a lower fatigue level in the aroma hand massage group than in the comparison group (without essential oil). The treatment was performed for 5 to 10 minutes for a total of 14 sessions (2 times a day for 2 weeks) and lavender, chamomile and ginger oil were used. Based on this comparison, while the aromatherapy improved the fatigue in patients with hemodialysis and pain [19] [20], it did not in the hospice patients. While previous studies reported a significant improvement on fatigue by providing the aromatherapy for 5 to 10 minutes over 12 times for over 2 weeks, the current study offered treatment for only 5 times in total because of the hospice patients' health condition. It is assumed that 5 sessions of aroma therapy were not enough to produce a significant effect on fatigue for the hospice patients. It may be worthwhile to investigate the effect of aroma hand massage given for more than 5 sessions in further studies if the health condition of hospice patients is sufficient and patients are selected on basis of their health condition.

Fatigue is caused by different factors such as pain, depression, low quality of life and functional limitations [34], but those factors were not initially assessed and controlled in this study because the hospice clients complained of being tired by measurements with several instruments. Thus, these factors need to be measured in further studies if possible. We measured the fatigue level only once after the massage therapy had been started, at the post-test when the massage was completed. It is recommended to measure the fatigue level more than once to investigate the continuous effect of massage on fatigue in hospice clients during a study.

The findings of the current study showed no difference in sleeping between the both groups. They were consistent with previous studies [32]. Soden and colleagues (2004) [32] compared the effect of aroma massage therapy with massage only on sleeping in hospice clients. Lavender was chosen as the essential oil and mixed in sweet almond oil to a dilution of 1%. Each intervention was received for 30 minutes in the morning, weekly for 4 weeks. Soden's study (2004) [32] showed no significant difference in sleeping between the 2 groups and the findings were consistent with the current study. On the other hand, Lee and Kim's study (2011) [35] reported significant differences in sleep satisfaction and sleeping hours between the aroma hand massage group and massage group. In the study of Lee and Kim (2011) [35], 1% lavender essential oil with 50 ml sweet almond oil was used once per day for 3 days right before going to sleep. For the hand massage group, a massage with sweet almond oil without any essential oil was applied in the same way. All 3 studies compared the effects of aroma hand massage with hand massage on sleeping of hospice clients or cancer clients and used the same lavender essential oil with 1% dilution even though the timing and duration of intervention were different. For consistent findings, further studies would be needed with larger sample size and longer duration of treatment.

We used lavender and bergamot essential oils because they were reported to help clients relax in previous studies [15] [21]. One study subject expressed displeasure with the smell of the oil in the early days of this study and wanted to drop from the study. Also, a few subjects in the experimental group wanted sometimes only massage without aroma oil to be applied a couple of times, but they did not want to drop from the group. Based on the findings, even though lavender and bergamot oils have been reported as 2 of the best oils for inducing relaxation, the client's preferences for the type of oil needs to be taken into consideration. In addition, comparisons of the effects of different types of oils need to be conducted to determine the best oil for alleviating fatigue and improving sleep in hospice clients in further studies.

In this study, the essential oil was blended to 1% because essential oils diluted to 1% were used in previous studies on cancer patients [31] [32]. However, many subjects in this study mentioned that they could not smell the oil well and they could not tell if there was any difference between the massage oil containing the essential oil and the massage oil that did not contain the essential oil. In the present study, most of subjects were hospice clients with cancer and they differed in their ability to smell the essential oil because of their health status, so there is a need to assess the clients' individual ability to smell in order to assess the maximum effect that essential oils have on subjects including their effect on the olfactory organ. It may be useful to compare the effect on fatigue and sleep of oils that have been blended with other oils at different proportions in hospice patients. In addition, it is needed to test blending the essential oil to 1% for hospice clients is appropriate or not.

The findings of this study are too limited to draw definite conclusions because the study was conducted on only 30 subjects staying at 1 local hospital. In addition, the measurement of fatigue was conducted only once af-

ter the interventions were initiated at the completion of the interventions. Therefore, it was difficult to investigate consistent effects of aroma massage on fatigue, because this requires multiple measurements at different moments. Thus, investigating the consistent effects of aroma massage with different types of oil on hospice clients in different settings is recommended for further studies.

5. Conclusion

We compared the effect on fatigue and sleep of aroma hand massage vs. only hand massage without aroma oil in hospice patients. The findings of this study showed that there were no significant differences on fatigue, quantity of sleep and quality of sleep between both groups. Because the current study provided only 5 times of aroma hand massage and showed no effects, the authors suggested further studies with more than 5 sessions to investigate the significant effects of the interventions if the health condition of hospice patients was adequate. In this study, some of hospice patients seriously mentioned that they could not even smell the aroma oil or they did not prefer the certain smell of aroma oil even though lavender and bergamot oils were reportedly the 2 best oils for relaxation induction. Therefore, it was recommended to consider the client's preferences for the type of oil prior to the initiation of any aroma therapy in further studies.

References

[1] Hutcheson, A. (2011) Hospice Care in the United States. Primary Care: *Clinics in Office Practice*, **38**, 173-182. http://dx.doi.org/10.1016/j.pop.2011.03.002

[2] 2010 Elderly's Statistics: Korean Statistical Information Service. http://kostat.go.kr/portal/korea/kor_nw/2/1/index.board?bmode=read&aSeq=180000

[3] Kang, J.A., Koh, S.J., Kim, D.G., Kim, M.J., Kim, S.J., Kim, O.K., *et al.* (2012) Introduction of Hospice and Palliative Care for Palliative Care Team. Rev. Ed., Ministry of Health & Welfare, National Cancer Center, Seoul & Gyeonggido.

[4] Javier, N.S. and Montagnini, M.L. (2011) Rehabilitation of the Hospice and Palliative Care Patient. *Journal of Palliative Medicine*, **14**, 638-648. http://dx.doi.org/10.1089/jpm.2010.0125

[5] Radbruch, L., Strasser, F., Elsner, F., Goncalves, J.F., Loge, J., Kaasa, S., *et al.* (2008) Fatigue in Palliative Care Patients—An EAPC Approach. *Palliative Medicine*, **22**, 13-32. http://dx.doi.org/10.1177/0269216307085183

[6] Byun, H.S., Kim, G.D., Chung, B.Y. and Kim, K.H. (2010) Fatigue and Quality of Life of Korean Cancer Inpatients. *The Korean Journal of Hospice and Palliative Care*, **13**, 98-108.

[7] Jung, E.J., Park, M.I. and Jung, Y. (2004) Factors Related to Fatigue in Cancer Patients Receiving Chemotherapy. *The Korean Journal of Hospice and Palliative Care*, **7**, 179-188.

[8] Kim, Y.H. and Han, J.S. (2011) Factors Related to the Quality of Sleep in the Elderly Women. *Journal of the Korea Academia-Industrial Cooperation Society*, **12**, 4467-4474. http://dx.doi.org/10.5762/KAIS.2011.12.10.4467

[9] Sok, S.H. and Choi, J.H. (2010) Factors Influencing Sleep of Elderly Women. *Journal of Korean Academy of Nursing*, **40**, 119-126. http://dx.doi.org/10.4040/jkan.2010.40.1.119

[10] Lee, H.M., Ryu, S.A. and Kim, E.A. (2009) Factors Influencing Sleep Disorders in Patients on Hemodialysis. *Journal of Korean Academy of Fundamentals of Nursing*, **16**, 190-199.

[11] Chang, S.Y. (2008) Effects of Aroma Hand Massage on Pain, State Anxiety and Depression in Hospice Patients with Terminal Cancer. *Journal of Korean Academy of Nursing*, **38**, 493-502. http://dx.doi.org/10.4040/jkan.2008.38.4.493

[12] Buss, T., de Walden-Galuszko, K., Modlinska, A., Osowicka, M., Lichodziejewska-Niemierko, M. and Janiszewska, J. (2010) Kinesitherapy Alleviates Fatigue in Terminal Hospice Cancer Patients—An Experimental, Controlled Study. *Supportive Care in Cancer*: *Official Journal of the Multinational Association of Supportive Care in Cancer*, **18**, 743-749. http://dx.doi.org/10.1007/s00520-009-0709-0

[13] Choi, Y.K. (2010) The Effect of Music and Progressive Muscle Relaxation on Anxiety, Fatigue, and Quality of Life in Family Caregivers of Hospice Patients. *Journal of music therapy*, **47**, 53-69. http://dx.doi.org/10.1093/jmt/47.1.53

[14] Styles, J. (1997) The Use of Aromatherapy in Hospitalized Children with HIV. *Complementary Therapies in Nursing*, **3**, 16-20. http://dx.doi.org/10.1016/S1353-6117(97)80029-7

[15] Buckley, J. (2002) Massage and Aromatherapy Massage: Nursing Art and Science. *International Journal of Palliative Nursing*, **8**, 276-280. http://dx.doi.org/10.12968/ijpn.2002.8.6.10497

[16] Halcon, L.L. and Buckle, J. (2006) Aromatherapy. In: Snyder, M. and Lindquist, R., Eds., *Complementary/Alternative therapies in Nursing*, 5th Edition, Springer Publishing Company, New York, 323-344.

[17] Kolcaba, K., Dowd, T., Steiner, R. and Mitzel, A. (2004) Efficacy of Hand Massage for Enhancing the Comfort of

Hospice Patients. *Journal of Hospice and Palliative Nursing*, **6**, 91-102. http://dx.doi.org/10.1097/00129191-200404000-00012

[18] Lin, P.W., Chan, W.C., Ng, B.F. and Lam, L.C. (2007) Efficacy of Aromatherapy (*Lavandula angustifolia*) as an Intervention for Agitated Behaviours in Chinese Older Persons with Dementia: A Cross-Over Randomized Trial. *International Journal of Geriatric Psychiatry*, **22**, 405-410. http://dx.doi.org/10.1002/gps.1688

[19] Kang, S.J. and Kim, N.Y. (2008) The Effects of Aroma Hand Massage on Pruritus, Fatigue and Stress of Hemodialysis Patients. *The Journal of Korean Academic Society of Adult Nursing*, **20**, 883-894.

[20] Kim, I.J. and Kim, E.K. (2009) Effects of Aroma Massage on Pain, Activities of Daily Living and Fatigue in Patients with Knee Osteoarthritis. *Journal of Muscle and Joint Health*, **16**, 145-153.

[21] Lee, J.E., Lee, Y.W. and Kim, H.S. (2011) Effects of Aroma Hand Massage on the Stress Response and Sleep of Elderly Inpatients. *Journal of Korean Academy of Fundamentals of Nursing*, **18**, 480-487.

[22] Kim, M.H. and Sung, K.W. (2006) The Effects of Aroma Foot Massage on the Anxiety, Pain and Sleep Satisfaction during Colonoscopy under Conscious Sedation. *Journal of Korean Academy of Community Health Nursing*, **17**, 91-101.

[23] Jung, H.N. and Choi, H.J. (2012) Effects of *Lavandula angustifolia* Aroma on Electroencephalograms in Female Adults with Sleep Disorders. *Journal of Life Science*, **22**, 192-199. http://dx.doi.org/10.5352/JLS.2012.22.2.192

[24] Faul, F., Erdfelder, E., Buchner, A. and Lang, A.G. (2009) Statistical Power Analyses Using G*Power 3.1: Tests for Correlation and Regression Analyses. *Behavior Research Methods*, **41**, 1149-1160. http://dx.doi.org/10.3758/BRM.41.4.1149

[25] Piper, B.F., Dibble, S.L., Dodd, M.J., Weiss, M.C., Slaughter, R.E. and Paul, S.M. (1998) The Revised Piper Fatigue Scale: Psychometric Evaluation in Women with Breast Cancer. *Oncology Nursing Forum*, **25**, 677-684.

[26] Sohn, S.K. (2002) Relationship between Fatigue and Sleep Quality in Patients with Cancer. *Journal of Korean Academic Society of Adult Nursing*, **14**, 378-389.

[27] Snyder-Halpern, R. and Verran, J.A. (1987) Instrumentation to Describe Subjective Sleep Characteristics in Healthy Subjects. *Research in Nursing & Health*, **10**, 155-163. http://dx.doi.org/10.1002/nur.4770100307

[28] Smith, M.C., Kemp, J., Hemphill, L. and Vojir, C.P. (2002) Outcomes of Therapeutic Massage for Hospitalized Cancer Patients. *Journal of Nursing Scholarship*, **34**, 257-262. http://dx.doi.org/10.1111/j.1547-5069.2002.00257.x

[29] Kang, J.E. and Kim, K.S. (1994) The Effect of Preparatory Audiovisual Information with Videotape Influencing on Sleep and Anxiety of Abdominal Surgical Patients. *Journal of Korean Academy of Fundamentals of Nursing*, **1**, 19-36.

[30] Kim, S.M., Kim, G.R., Kim, R., Kim, B.I. and Kim, S.O. (2013) Theory and Practice of Aromatherapy. Korea Aromatherapy Association, Jungmunkag.

[31] Kohara, H., Miyauchi, T., Suehiro, Y., Ueoka, H., Takeyama, H. and Morita, T. (2004) Combined Modality Treatment of Aromatherapy, Footsoak, and Reflexology Relieves Fatigue in Patients with Cancer. *Journal of Palliative Medicine*, **7**, 791-796. http://dx.doi.org/10.1089/jpm.2004.7.791

[32] Soden, K., Vincent, K., Craske, S., Lucas, C. and Ashley, S. (2004) A Randomized Controlled Trial of Aromatherapy Massage in a Hospice Setting. *Palliative Medicine*, **18**, 87-92. http://dx.doi.org/10.1191/0269216304pm874oa

[33] Wilcock, A., Manderson, C., Weller, R., Walker, G., Carr, D., Carey, A.M., *et al*. (2004) Does Aromatherapy Massage Benefit Patients with Cancer Attending a Specialist Palliative Care Day Centre? *Palliative Medicine*, **18**, 287-290. http://dx.doi.org/10.1191/0269216304pm895oa

[34] Jakobsson, U. (2006) A Literature Review on Fatigue among Older People in Pain: Prevalence and Predictors. *International Journal of Older People Nursing*, **1**, 11-16. http://dx.doi.org/10.1111/j.1748-3743.2006.00004.x

[35] Lee, E. and Kim, K.S. (2011) The Effects of Aroma Hand Massage on Anxiety and Sleep in Cancer Patients during Hospitalization. *Perspectives in Nursing Science*, **8**, 42-53.

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Improving System Wide Hospital Efficiency at the Community Level

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Abstract

This study reviewed programs to improve the efficiency of hospital utilization in the metropolitan area of Syracuse, New York between 1998 and 2015. It involved indicators that were largely under the control of hospitals and their nursing and administrative staffs, such as inpatient stays and post admission complications, as well as programs where there was less provider control such as inpatient admissions and readmissions. Large reductions in inpatient lengths of stay were generated by the Syracuse hospitals, contributing to a decline in the average daily adult medicine and adult surgery census of 140 patients. Reductions in post admission complications contributed to these developments. The study suggested that efforts to reduce inpatient admissions in the Syracuse hospitals had limited results. The areas hospital admission rate was conservative, but approximately 2000 resident discharges per year above that of a neighboring community. The need for reduction of hospital admissions resulted from the absence of provider or payor efforts to develop alternative resources in the community. If the experience of the Syracuse hospitals is typical, improvement of the efficiency of community health systems will require creativity and resources from providers. Perhaps more importantly, health care payors will need to assume an active role in these efforts.

Keywords

Hospitalization, Hospital Lengths of Stay, Hospital Outcomes, Health Care Costs

1. Introduction

In the United States, increased attention is focusing on improving the efficiency of hospital utilization. These

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efforts have important implications for nursing and administrative managers in health care. Historically, this interest has developed because hospitals are responsible for a large proportion of health care expenses [1] [2].

Much of the initiative to improve efficiency has been generated by health care providers. Because inpatient reimbursement is based on prospective payments, regardless of the amount of related expenses, hospitals have an interest in reducing costs.

Provider sponsored efforts to improve efficiency have tended to focus on areas where hospital control and the impact of clinical management is maximized, such as the reduction of inpatient stays and post admission complications. Shorter stays are usually associated with lower costs, especially for patients discharged home and without extensive long term care services. Inpatient complications can frequently be reduced because the hospital controls the patient environment [3]-[6].

In recent years, the interest of payers in improving health care efficiency has also increased. This has been stimulated by the efforts of public and private payers to control their own expenses, as well as the notion that efficient care is frequently better care [7] [8]. A number of payer sponsored efforts to improve hospital efficiency have been based on reduction of inpatient admissions. Administrative data have demonstrated that large differences in admissions and discharges per population exist in the United States. This information has been reinforced by rising interest in population health and population health care. These initiatives have also included programs implemented by health care payers that penalize hospitals for excessive readmissions [9].

These developments have important implications for nursing and health care management. They are being played out in local health care systems within the United States. They include programs for implementation within hospitals and those that require involvement of providers and payers at the community level.

2. Population

The study evaluated the impact of efforts to improve the efficiency of care in the hospitals of Syracuse, New York through internal services and through services in the community. The Syracuse area includes three acute care facilities, Crouse Hospital (19,776 discharges excluding well newborns, 2015), St. Joseph's Hospital Health Center (24,803 discharges, 2015), and Upstate University Hospital (28,237 discharges, 2015). The hospitals work with a combined medical staff of over 1800 physicians and 12 local nursing homes.

The Syracuse hospitals provide primary and secondary acute care to the metropolitan area with a population of approximately 600,000. They provide tertiary services to the Central New York Health Service Area with a population of approximately 1,400,000 [10].

Historically, the Syracuse hospitals have worked cooperatively to improve the efficiency of acute care through initiatives that focus largely on inpatient acute care and through initiatives that involve services in the community. A number of these initiatives have been developed through their cooperative planning organization, the Hospital Executive Council [11].

Efforts to improve efficiency through internal services have included reduction of inpatient stays and post admission complications. Length of stay reduction programs have been implemented in all of the hospitals beginning in 1983. Efforts to address inpatient complications have been addressed by a cooperative program with 3M™ Health Information Systems between 2010 and 2014 [12].

A number of efforts of the Syracuse hospitals to improve the efficiency of acute care through services in the community involve reduction of inpatient admissions. Historically, providers and payers in the community decided against construction of another acute hospital and the development of additional ambulatory care services. This contributed to the efficiency of inpatient acute care for years. More recently, major health care payers such as Medicaid and Blue Cross have attempted to reduce inpatient hospital utilization at the regional and local levels.

3. Method

This study evaluated the impact of efforts to improve the efficiency of hospital utilization in the metropolitan area of Syracuse, New York over a multi year period. It focused on programs that largely involved activities within hospitals, reduction of inpatient stays and post admission complications, and programs that required involvement of services in the community, reduction of inpatient admissions and readmissions.

The study was carried out using patient specific data from each of the hospitals by the Hospital Executive Council. These data were obtained through Business Associate Agreements with each of the hospitals. The

Council functions as a mechanism for the development of multihospital studies in the Syracuse metropolitan area.

The evaluation of utilization and outcomes indicators in this study focused on changes in longitudinal data for the Syracuse hospitals. These comparisons identified the development of each of the study indicators over time. Through these comparisons, it was possible to identify the impact of each of the indicators on hospital admissions or patient days through time periods. Where useful comparison information from larger populations was available, such as national mean lengths of stay and admission rates for New York State metropolitan areas, this information was used in the analysis.

Efforts to reduce inpatient stays in the Syracuse hospitals focused on adult medicine and adult surgery patients, who account for more than 70 percent of utilization in the hospitals. The study data included adult medicine and adult surgery lengths of stay for the combined hospitals for the period 1998-2015. For each service, the hospital stays were compared with the severity adjusted national average to identify differences in stays and patient days. The All Patients Refined Severity of Illness System developed by 3M™ Health Information Systems was used to identify the severity adjusted differences [13].

Efforts to reduce post admission inpatient complications in the Syracuse hospitals focused on adult medicine and adult surgery patients for the period 2008-2015. The study data were based on complication rates, based on numbers of post admission complications divided by total at risk populations for Crouse Hospital and St. Joseph's Hospital Health Center, which participated in a community wide demonstration program addressing this indicator between 2008 and 2014. This analysis was based on the Potentially Preventable Complications software developed by 3M™ Health Information Systems [14].

Efforts to address inpatient hospital admission rates in the Syracuse hospitals focused on adult medicine, adult surgery, and pediatric patients including neonates for New York State metropolitan counties. The study data were based on resident hospital discharges for the period 2007-2015. This analysis included all hospital admissions except obstetrics, to control for variations in birth rates, and mental health, because data were not available for New York State psychiatric hospitals. The patient populations were identified using the All Patients Refined Diagnosis Related Groups developed by 3M™ Health Information Systems and demographic data collected from the New York Statewide Planning and Research and Cooperative System.

Efforts to address inpatient readmissions in the hospitals of Syracuse, New York focused on adult medicine and adult surgery patients between January 2013 and February 2016. Quarterly data for each of the three Syracuse hospitals were used to evaluate changes in readmission rates and related utilization. This information was analyzed using the Potentially Preventable Readmissions software developed by 3M™ Health Information Systems.

4. Results

The initial component of the study focused on reduction of inpatient lengths of stay for adult medicine and adult surgery, the largest inpatient services in the Syracuse hospitals. Relevant data are summarized in **Table 1**.

These data demonstrated that considerable reductions in inpatient stays and related utilization occurred in the Syracuse hospitals between 1998 and 2008. The mean length of stay for adult medicine declined from 5.89 to 4.98 days. This resulted in a change from 36,653 to 8569 days above the severity adjusted national average. This amounted to a savings of 28,084 patient days or an average daily census of 76.9 patients.

The mean length of stay for adult surgery declined from 6.66 to 6.23 days between 1998 and 2008. This resulted in a change from 24,924 to 11,544 days above the severity adjusted national average. This amounted to a savings of 13,380 patient days or an average daily census of 36.7 patients.

These substantial reductions in stays in the Syracuse hospitals occurred through provider efforts to reduce stays for discharges home and to long term care services in the community. They were stimulated by the change in hospital reimbursement from payments per day to payments per discharge by Medicare and other health care payers.

Since 2008, efforts to reduce inpatient stays have continued in the Syracuse hospitals. The data in **Table 1** demonstrated that stays for adult medicine increased from 4.98 days in 2008 to 5.45 days in 2014. This development was caused by the difficulty of generating further reductions in stays and by the shift of some Medicare patients at low severity of illness to Medical Observation status in 2013. This caused the stays for the remaining adult medicine populations to increase. For adult surgery, where this change did not apply, provider efforts supported a further reduction in stays from 6.23 to 6.04 days between 2008 and 2014.

Table 1. Inpatient mean lengths of stay, adult medicine and adult surgery, Syracuse Hospitals, 1998, 2008, 2010, 2012, 2014.

	1998	2008	2010	2012	2014
Adult Medicine					
Number of Discharges	25,278	28,565	32,221	35,274	33,421
Mean Length of Stay (Days)	5.89	4.98	5.18	5.14	5.45
Severity Adjusted National Average	4.44	4.68	4.84	5.00	5.20
Length of Stay Difference	1.45	0.30	0.34	0.14	0.25
Patient Days Difference	36,653.10	8569.50	10,955.14	4938.36	8355.25
Adult Surgery					
Number of Discharges	20,100	19,241	19,170	20,439	20,562
Mean Length of Stay (Days)	6.66	6.23	6.25	6.04	6.04
Severity Adjusted National Average	5.42	5.63	5.89	5.75	5.95
Length of Stay Difference	1.24	0.60	0.36	0.29	0.09
Patient Days Difference	24,924.00	11,544.60	6901.20	5927.31	1850.58

Adult medicine data exclude Diagnosis Related Groups concerning surgery, obstetrics, pediatrics, psychiatry, alcohol/substance abuse treatment, rehabilitation, and all patients aged 0 - 17 years. Adult surgery data exclude Diagnosis Related Groups concerning medicine, obstetrics, pediatrics, psychiatry, alcohol/substance abuse treatment, and all patients aged 0 - 17 years. Source: Hospital Executive Council.

The reductions in stays for both major hospital services produced considerable declines in excess patient days in the combined Syracuse hospitals compared with severity adjusted national averages between 1998 and 2014. For adult medicine, the number of excess days declined by 28,298, or an average daily census of 77.5. For adult surgery, the number of excess days declined by 23,074, or an average daily census of 63.2. Length of stay reduction in the combined services produced a reduction in the average daily census of more than 140 patients.

Since 2008, the Syracuse hospitals developed programs to reduce stays for discharges to nursing homes, the major remaining source of excess stays. The impact of these programs, focusing on Difficult to Place and Complex Care patients, has been more visible in adult surgery because of the effect of the Medical Observation Program in adult medicine.

The second component of the study focused on reduction of post admission complications for two of the Syracuse hospitals between 2009 and 2014. Relevant data are summarized in **Table 2**.

This information concerned an outcomes indicator that was largely under the control of the hospitals. Post admission complications could, at least theoretically, be limited through infection control and other quality assurance programs.

The study data demonstrated that aggregate complications per 1000 at risk discharges declined from 42.65 to 28.13 at Crouse Hospital and from 56.31 to 32.91 at St. Joseph's Hospital Health Center between 2009 and 2012. This was the initial period of the demonstration program involving the hospitals and 3M™ Health Information Systems. The data also demonstrated that, between 2012 and 2014, the aggregate complication rate at Crouse Hospital did not exceed 29.12 and the rate at St. Joseph's Hospital Health Center did not exceed 34.87.

Additional study data for individual complication rates at the two hospitals reinforced this information. For pneumonia, between 2009 and 2012, the rate at Crouse Hospital declined from 6.40 to 3.68 while the rate at St. Joseph's Hospital Health Center declined from 13.16 to 8.15. After 2012, the rates for pneumonia did not exceed 4.81 at Crouse Hospital and 10.06 at St. Joseph's. For urinary tract infection between 2009 and 2012, the rate at Crouse Hospital declined from 8.80 to 7.68, while the rate at St. Joseph's declined from 9.03 to 5.29. After 2012, the rates for urinary tract infection did not exceed 7.14 at Crouse Hospital and 6.61 at St. Joseph's.

The third component of the study concerned hospital admission/discharge rates in the Syracuse hospitals. Data comparing rates for New York State metropolitan areas are summarized in **Table 3**. These rates include all discharges except obstetrics, because of variations in birth rates, and mental health, because information concerning State psychiatric centers was not available.

These data demonstrated that the hospitalization rates for the six New York State metropolitan areas covered a considerable range. During the eight year period, this range declined from 30.8 in 2007 to 14.6 in 2015, from

Table 2. Potentially Preventable Complication rates per 1000 discharges, Crouse Hospital and St. Joseph's Hospital Health Center, 2009-2014.

	2009	2010	2011	2012	2013	2014	2015
Crouse Hospital							
Total	42.65	37.14	34.14	28.13	29.12	27.56	27.60
Pneumonia	6.40	5.73	4.21	3.68	4.38	4.81	3.12
Urinary Tract Infection	8.80	7.21	9.30	7.68	7.14	6.05	5.28
St. Joseph's Hospital Health Center							
Total	56.31	47.28	37.37	32.91	33.31	34.87	34.20
Pneumonia	13.16	10.85	7.64	8.15	9.25	8.69	10.06
Urinary Tract Infection	9.03	8.78	6.39	5.29	5.15	6.61	4.72

Table 3. Resident inpatient hospitalization rates per 1000 population, medical/surgical and pediatric/neonatal, New York state metropolitan areas.

Resident County	2007	2009	2011	2013	2015*
Albany County	90.7	-	-	-	-
Capital District (Albany, Schenectady, Rensselaer)	-	88.6	86.8	66.1	77.5
Erie County (Buffalo)	99.3	94.5	81.1	84.5	80.6
Monroe County (Rochester)	82.5	86.3	85.3	78.8	77.3
New York City (5 Burroughs)	101.8	95.7	87.3	90.7	81.9
Oneida County (Utica)	113.3	110.9	104.6	94.9	91.9
Onondaga County (Syracuse)	84.2	81.3	86.4	84.2	80.7

*Data annualized based on January-June 2015 actual experience. Data do not include obstetrics (APR DRGs 540-566), mental health/substance abuse treatment (APR DRGs 740-776), and rehabilitation (APR DRG 860). Prepared by: Hospital Executive Council.

the highest to the lowest rate for each year. This occurred as excess admissions were eliminated and statewide rates converged at more efficient levels.

Among the metropolitan areas of Syracuse and the other communities, the highest hospital admission/discharge rates were generated by New York City and Utica. During the period, the rates for these communities declined by more than 20 discharges per population, probably reflecting the impact of payer and provider initiatives on excess admissions.

Among the metropolitan areas of Syracuse and the other communities, the admission rates of Rochester and most recently Albany were relatively low. This may have reflected the impact of managed care plans located in both of these areas.

For the most recent years of the study data, the hospitalization rates for the Syracuse metropolitan area were slightly higher than those of Rochester and Albany. Between 2011 and 2015, for example, the difference between the rates for Syracuse and Rochester ranged from 1.1 to 5.4 discharges per 1000 population. These differences were much smaller than the statewide ranges. Based on the population of the Syracuse metropolitan area, they amounted to approximately 495 - 2430 additional discharges per year. They may have probably resulted from the fact that the rates for Syracuse were generated by hospitals, without much impact from managed care organizations. The absence of alternatives to hospital services in the community probably also contributed.

The fourth component of the analysis focused reduction of inpatient readmissions within 30 days of the initial admissions for adult medicine and adult surgery in the Syracuse hospitals between January 2013 and February 2016. Relevant data are summarized in **Table 4**.

These data demonstrated that inpatient readmissions in each of the Syracuse hospitals declined during the 38 month period. The sizes of these reductions ranged from less than one day at St. Joseph's Hospital Health Center and Upstate University Hospital to almost two days at Crouse Hospital.

At the same time, the data demonstrated that these declines occurred as cyclical reductions at each of the hospitals. Eight of these reductions included two quarters, three included three quarters, and two included four

Table 4. Potentially Preventable Readmissions, adult medicine and adult surgery patients, all payors, Syracuse hospitals by quarter.

	Crouse Hospital			St. Joseph's Hospital Health Center			Upstate University Hospital - SUNY UMU		
	Number of Readmissions	Readmission Rate	Declining Cycles	Number of Readmissions	Readmission Rate	Declining Cycles	Number of Readmissions	Readmission Rate	Declining Cycles
1Q 2013	248	7.55	-	462	8.36	-	362	7.47	
2Q 2013	245	7.48	-	392	6.90	2	401	7.90	
3Q 2013	216	6.96	3	447	8.05	-	400	8.15	-
4Q 2013	258	7.90	-	433	7.89	2	290	6.41	2
1Q 2014	211	6.95	2	443	8.32	-	342	7.66	-
2Q 2014	254	7.62	-	286	7.66	2	345	7.38	2
3Q 2014	231	6.86	-	439	8.00		363	7.68	-
4Q 2014	232	6.68	-	450	8.04		359	7.62	2
1Q 2015	224	6.62	4	434	8.21	-	427	8.89	-
2Q 2015	238	6.94	-	414	7.80	-	350	6.98	2
3Q 2015	201	5.98	-	414	7.72	-	396	7.85	-
4Q 2015	187	5.51	3	386	6.94	4	329	6.79	-
Jan.-Feb. 2016	120	5.61		292	8.17		225	6.78	3
Number of Readmission Rate Cycles									
2 Quarters			1			3			4
3 Quarters			2			0			1
4 Quarters or More			1			1			0

quarters before rates increased. The data demonstrated that the reductions were sporadic rather than sustained trends over extended periods of time.

Additional study data demonstrated that the impacts of these reductions in readmissions on the inpatient adult medicine and surgery censuses of the hospitals were limited. Between the first quarter of 2013 and the fourth quarter of 2015, the number of readmissions in the combined hospital declined by 170. This amounted to a reduction of 1190 inpatient days or an average daily census of 3.3 patients.

The limited nature of the reduction of readmissions on the inpatient census of the hospitals probably resulted from a combination of factors. The interest of providers in improving outcomes and the impact of payer reimbursement penalties were probably positive influences. The absence of alternatives to hospital services in the community and the fact that hospitals were still being reimbursed for individual readmissions may have slowed the process.

5. Discussion

Historically, efforts to improve the efficiency of health care in the United States have included programs that reduced hospital utilization. Because hospitals are associated with relatively high costs per patient, these initiatives have been a logical focus of efforts to improve efficiency.

This study reviewed a number of these programs in the hospitals of Syracuse, New York over extended time periods. It involved data indicators that were largely under the control of hospitals and their nursing and administrative staffs as well as programs where there was less provider control.

During the period of the study, large reductions in inpatient lengths of stay were generated in the Syracuse hospitals, contributing to a decline in the average daily adult medicine and adult surgery census of 140 patients. Inpatient stays required some involvement with long term care services, but for a minority of patients. Reductions in patient days related to post admission complications were also included in these developments.

The study suggested that efforts to reduce inpatient admissions in the Syracuse hospitals had more limited results. The area's hospital admission rate was conservative, but approximately 2000 discharges per year above that of Rochester, New York. Inpatient readmissions for adult medicine and surgery declined slowly, producing

a reduction of a few patients in the combined inpatient census of the hospitals.

The limited hospital admission rate resulted from the fact that the Syracuse area had constrained the development of inpatient hospital capacity in previous decades. This development reduced the potential for excess hospital admissions, especially for elderly patients. It was supported by a small managed care organization developed at the initiative of the hospitals. Since the 1990s, however, the local health system did not include a local managed care plan or extensive penetration by managed care plans from other areas.

To a large extent, the lack of a recent impact on hospital admissions or readmissions in the Syracuse hospitals resulted from the absence of provider or payer efforts to develop alternative services in the community where the impact of hospital nursing and administrative managers leave off. The area's primary care system has not taken a strong interest in reducing hospital admissions. Patients with chronic diseases and other conditions that require additional treatment are frequently referred to hospital emergency departments, often resulting in inpatient admission. The area's home health and nursing home providers have not supported the development of services that could avoid hospital admissions. Support for the modest programs that have been developed has come from the hospitals. There has been no payor involvement in these efforts.

This situation is probably most prevalent in small metropolitan areas such as Syracuse. These communities frequently lack the patient volume and provider resources to develop alternative services to hospitalization for individual providers.

From this information it is recommended that, if the experience of the Syracuse hospitals is typical, improvement of the efficiency of community health care systems will require creativity and resources from providers. These organizations, through their administrative and nursing staffs, have the experience with the mechanics of health care that is necessary to develop needed services. Although hospitals and other providers are frequently in competition, cooperation among them in small communities may be necessary to generate the caregiving resources required.

From this information it is recommended that, health care payors assume an active role in these efforts. If genuine improvements in health care efficiency and outcomes are to occur, payors need to invest time and financial resources in this process. They cannot take the position that paying for services in their traditional roles is enough. The development of additional services in small metropolitan areas such as Syracuse, New York will require substantial payor investment in planning and demonstration activities.

Additional research at the community level is needed to generate information that will contribute to improvements in the efficiency of care. Studies at the community level can contribute valuable information concerning a wide range of potential solutions.

6. Limitations

The information and conclusions identified in this study were limited to the indicators and data identified. These included lengths of stay in the Syracuse hospitals for adult medicine and adult surgery in 1998 through 2014 and Potentially Preventable Complications rates in two of the Syracuse hospitals for 2009-2015. They also included resident inpatient hospitalization rates per 1000 population in New York State metropolitan areas for 2007-2015 and Potentially Preventable Readmissions for adult medicine and adult surgery patients in the Syracuse hospitals for 2013 through 2016.

The conclusions of this study were based on data for these indicators and time periods. They are limited to the experiences of the hospitals of Syracuse, New York within these parameters.

References

[1] Dentzler, S. (2011) Urgent Measures for an Old Problem. *Health Affairs*, **30**, 1626. http://dx.doi.org/10.1377/hlthaff.2011.0961

[2] Auerbach, D.L. and Kellermann, A.L. (2011) A Decade of Health Care Cost Growth Has Wiped Out Real Income Gains for an Average US Family. *Health Affairs*, **30**, 1630-1636. http://dx.doi.org/10.1377/hlthaff.2011.0585

[3] Cushing, W.T. (2004) Extra Hospital Days Can Cost You Plenty. *Medical Economics*, **81**, 83.

[4] Friedman, B., De La Mare, J., Andrews, R. and McKenzie, D.H. (2002) Practical Options for Estimating the Costs of Hospital Stays. *Journal of Health Care Finance*, **291**, 1-12.

[5] Fuller, R.L., McCullough E.C., Bao, M.Z. and Averill, R.F. (2009) Estimating the Costs of Potentially Preventable Hospital Acquired Complications. *Health Care Financing Review*, **30**, 17-32.

[6] Sheng, W.H., Wang, J.T., Lu, D.C., Chie, W.C., Chen, Y.S. and Chang, S.C. (2005) Comparative Impact of Hospital Acquired Infections on Medical Costs, Length of Hospital Stay, and Outcomes between Community Hospitals and Medical Centres. *Journal of Hospital Infections*, **59**, 205-214. http://dx.doi.org/10.1016/j.jhin.2004.06.003

[7] Skinner, J., Chandra, A., Goodman, D. and Fisher, E.S. (2009) The Elusive Connection between Health Care Spending and Quality. *Health Affairs*, **28**, 1256-1258. http://dx.doi.org/10.1377/hlthaff.28.1.w119

[8] Jencks, S.F., Williams, M.V. and Coleman, E.A. (2011) Rehospitalizations among Patients in the Medicare Fee for Service Program. *New England Journal of Medicine*, **364**, 1582. http://dx.doi.org/10.1056/NEJMx110014

[9] Rau, J. (2012) Medicare to Penalize 2211 Hospitals for Excess Readmissions. *Kaiser Health News*.

[10] Lagoe, R., Pasinski, T., Kronenberg, P., Quinn, T. and Schaengold, P. (2006) Linking Health Services at the Community Level. *Canada Health Care Quarterly*, **9**, 60-65. http://dx.doi.org/10.12927/hcq..18229

[11] Lagoe, R. and Lagoe, R. (2014) Tracking the Sustainability of Improvements in Hospital Outcomes. *Advances in Bioscience and Biotechnology*, **5**, 895-902. http://dx.doi.org/10.4236/abb.2014.511104

[12] Lagoe, R.J. and Westert, G.P. (2010) Evaluation of Inpatient Hospital Complications: A Planning Approach. *Health Services Research*, **10**, 200. http://dx.doi.org/10.1186/1472-6963-10-200

[13] Lagoe, R.J., Westert, G.P., Kendrick, K., Morreale, G. and Mnich, S. (2005) Managing Hospital Length of Stay Reduction: A Multihospital Approach. *Health Care Management Review*, **30**, 89-92. http://dx.doi.org/10.1097/00004010-200504000-00002

[14] Goldfield, N.I., McCullough, E.C, Hughes, J.S., Tang, A.M., Eastman, B., Rawlins, L.K. and Averill, R.F. (2009) Identifying Potentially Preventable Readmissions. *Health Care Financing Review*, **30**, 75-92.

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Psychosocial and Sociodemographic Predictors of Depression among Older Persons in Jordan

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Abstract

The average annual growth rate for the ageing population is increasing considerably. The purpose of this study is to examine the psychosocial predictors of depression among older persons in Jordan. Methods: A quantitative approach using cross-sectional, descriptive-correlational design was used to carry out on a nationally representative, stratified multistage clustered area probability sample of non-institutionalized adults (aged ≥ 60 years). Data collected using self-report (structured format) of data collection. Data collected in regards to depression, social support, life satisfaction, and psychological distress. Results: About 55.5% of the participants have none to slight depressive symptoms, 22% of them have mild depressive symptoms, 17.3% of them have moderate depressive symptoms, and only 5.2% of them have severed depressive symptoms. Older persons have moderate levels of life satisfaction, perceived social support and psychological distress. Type of diagnosis was not a significant predictor of depressive symptoms as it was in model 1 while working status and marital status remained significant predictors. In addition, perceived social support total (β = −1.98, 0.016), psychological distress (β = 0.465, <0.001), and life satisfaction (β = −0.284, <0.001) were significant predictors of depressive symptoms. Conclusion: Effective, community-level primary mental health care for older people is crucial, and its recommended to equally focus on the long-term care of older adults suffering from mental health problems, as well as to provide caregivers with education, training and support.

Keywords

Older Person, Depression, Social Support, Life Satisfaction, Psychological Distress, Jordan

1. Introduction

The average annual growth rate for the ageing population is increasing considerably. During the period 1950-

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1955, the annual growth rate for persons aged 60 years or over was 1.7%, while by the year 2005-2010, the annual growth rate for the older population increased up to 2.6% [1]. The world's older population, those at age of 60 or above, in 2010 was about 760 million and expected to reach two billions by the year 2050 (UN, 2009). Between 2015 and 2050, the proportion of the world's older adults is estimated to almost double from about 12% to 22% [1]. The literature provides evidence that older persons are not privileged with housing and community facilities that help them to live comfortably, remain active, engaged effectively, and sustain their wellbeing in social activity [1]. Such conditions have called for more attention to aspects and quality of health care provided to older persons. For example, studies show that older individuals in good health enjoy a greater sense of personal wellbeing and can participate more actively in the economic, social, cultural and political life of society [2]. Given the increased age of survival and decline of mortality rate, it is unclear how many of the additional years of life are spent in good health. People living in developing countries not only have lower life expectancies than those in developed countries, but also live in poor health [1]. For all age groups, levels of moderate and severe impairment are higher in low- and middle-income countries than in high-income countries [2]. The average global prevalence of moderate and severe impairment is about three times higher among persons aged 60 years or over than among those aged 15 - 59 years. Studies in both developed and developing countries show that women's advantage in life expectancy is accompanied by a greater burden of chronic disease and impairment in old age. Although women can expect to live longer than men and to spend a greater total number of years in good health; however, women spend a greater proportion of their older years in poor health [1]. Several of these long-term physical, mental, intellectual or sensory impairments, in interaction with various barriers, may constitute a disability and interfere with the full and effective participation of older persons in society. Thus this study attempts to investigate physical, psychological and social wellbeing of older person in Jordan.

According to Doumit and Nasser [3], older persons are overwhelmed with psychological stressors due to requirement related to management of their health problems. However, individual's psychosocial status may interfere with their ability to manage their needs independently that may exacerbate their health condition [4]. The comorbidity of psychological problems with physical problems and health conditions raise the issue of the impact of psychological disturbances on health condition. The literature shows that the psychological difficulties and psychological follow up care have been linked with increased morbidity, mortality, and expenditure of health services [5]. Health care professional may sacrifice psychological care and focus only on patients' physiological needs. This will negatively influence the disease prognosis resulting in poor treatment outcomes and may increase mortality rate [6]. The impact of aging on the bio-psycho-social aspects of individual's health and wellbeing cannot be interpreted solely in terms of disease process, but also relates to difficulties of individuals' adjustment to their illnesses and the evolved changes of their lifestyle [7] [8] (Chen, & Chang, 2012; MacDonald, 2005). Therefore, issues, for example, related to depression, coping, social support, stress, optimism, and life satisfaction are significant in process of health-illness continuum.

In Jordan, older people will continue to grow at a rate of 4.1%, from 220,000 to half million by 2030 and to 1.25 million by 2050 [9]. The dependency ratio for older people over 64 years of age is expected to increase from 6.0% to 16.0% [10]. Few studies have addressed the bio-psychosocial wellbeing of older person since that study. For example, Shishani [11] reported that most of the diagnosed cases of hypertension and cancer in Jordan are older people and that physical impairment forms more than one third of the older people in Jordan. Pervious Jordanian studies focusing on physical problems showed that 10% - 16% of older person have neurological problems that include vision, speech, hearing, and neurological deficits [11]. Also about 7% - 15% of older persons found to have chronic illnesses [11]-[13]. Moreover, the most common psycho-social problems among Jordanian's older people include relationship issues with family, lack of interest in social activities, loneliness, sleep disorders, anxiety and depression, and neglect and insufficient care [10].

As noted, few studies have addressed the physical and psychosocial problems of older persons. However, with evidence growing in Jordan, similar to the other countries in the world, small portion of expenditure (26%) of health care spending was allocated to preventative services while older population ratio is increasing. This provokes the need to understand older persons' psychosocial and physical health status as an indicative measure of the effectiveness and adequacy of quality of care provided. This also allows for better planning and allocation for health care expenditure that improve access to and the effectiveness and efficiency of health care services provided for elderly. This study came to respond to these concerns and more to increase our knowledge about the physical and psychosocial wellbeing of older persons at age of 60 years or above. Therefore, the purpose of this study is to examine the psychosocial predictors of depression among older persons in Jordan. The specific

aims are:

- To examine prediction power of stress, social support, life satisfaction, on depressive symptoms among older persons in Jordan controlling for demographic and personal characteristics.
- To identify the differences in depressive symptoms among older persons in relation to demographic and personal characteristics; age, gender, working status, and medical diagnosis.

2. Materials and Methods

2.1. Design

A quantitative approach using cross-sectional, descriptive-correlational design was used to carry out on a nationally representative, stratified multistage clustered area probability sample of non-institutionalized adults (aged ≥ 60 years). Data collected using self-report (structured format) of data collection. Data collected in regards to depression, social support, life satisfaction, and psychological distress.

2.2. Sample and Setting

All Jordanian persons at age of 60 years or above represented the population of this study. A total sample of 1400 older persons approached and 1058 agreed and participated in the study with a 76% response rate. Multistage quota sampling technique was used. The sample was drawn using quota sampling representing the proportion of older persons in the geographical areas in Jordan. Inclusion criteria included: 1) at age of 60 years or older, and 2) able to read and write in Arabic. Exclusion criteria were: persons who are physically and mentally incompetent to answer the surveys.

2.3. Data Collection Procedures

Ethical approval obtained prior data collection from the research committee at the University of Jordan. Consent form obtained from each participant. Privacy and confidentiality maintained and guaranteed for the participants. Structured format of data collection was used in the respondents' households by research team. Research assistants approached targeted population using door-to-door approach to invite person who are eligible for the study to participate in the study. For those who express interest to participate in the study, the research assistant asked the participants to sign the consent form, and collect the data and screen for their eligibility using the inclusion and exclusion criteria. Then, the researcher assistants explain the study and provide them with all details and answer all their questions. If the participant is unable to read, the research assistant with the presence of family member read the consent form and had the family member sign as witness. The consent form included information related to the title of the study, its purpose, its significance and a statement informing the participants that their privacy protected by assuring them that their responses will be treated confidentially, and information that reveal their identity will not be recorded. Also, the information will be used for the purpose of the study. Research assistants used the structured format. The whole package was presented in Arabic language. All data kept in a locked cabinet. To fill out the questionnaire, approximately 30 minutes needed, and if the participant is tired or wanted to rest the research assistants will give a recess period.

2.4. Instruments

The data collected using an Arabic version of scales. The instruments were:

1) **Depression** measured using the DSM-5 severity measure of depression scale [14]. The measure is formed of 9 items and asks the individual to rate his depressive feeling on a rank scale ranging from not at all (0) to nearly every day (3). A score of 0 - 4 (none), 5 - 9 (mild depression), 10 - 14 (moderate depression), 15 - 19 (moderately to severe depression), and 20 - 27 (severe depression). The scale has high agreement with major depression diagnosis based on structured interviews (78% sensitivity and 98% specificity).
2) **Stress** measured using the brief form of Psychological Stress Measure, Arabic version [15] study. The PSM was designed using nine items drawn from descriptors generated by focus groups on stress. The scale is unifactorial in structure and maintains a test-retest stability of 0.68 to 0.80. Participants checks the answer that best indicates the degree to which each statement has applied to him/her recently The responses made on a Likert scale and ranged from 1 (null) to 4 (much). The higher the score in the scale reflect higher level of psychological stress.

3) **Life satisfaction:** measured using the Satisfaction with Life Scale, Arabic version [15]. This is a general measure of life satisfaction, which consisted of five statements. Participants were asked to rate each statement according to the following seven-point scale: a) strongly disagree; b) disagree; c) slightly disagree; d) neither agree nor disagree; e) slightly agree; f) agree; g) strongly agree. The scores of the total scale ranges from 5 to 35 and interpreted as follow: from 31 - 35 (extremely satisfied), from 26 - 30 (satisfied), from 21 - 25 (slightly satisfied), 20 (neutral), from 15 - 19 (slightly dissatisfied), from 10 - 14 (dissatisfied), and 5 - 9 (extremely dissatisfied). The test-retest reliability was estimated in this study to be 0.87.
4) **Perceived social support:** measured by Multidimensional Scale of Perceived Social Support, Arabic version [16]. This scale is 12-item self-reported scale to assess the perception of social support adequacy from the family, friends, and significant others such as health care team. Each item is measured using a 7-point likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). The scale has three sub scales, family (items 3, 4, 8 & 11), friends (items, 7, 9 & 12), and significant others (items, 1, 2, 5 & 10). The total score ranges from 7 to 84. The higher the score is the higher the perceived social support. This scale had good internal consistency for the scale as whole which was 0.88.
5) **Potential covariates:** gender, age, marital status, type of disease, duration of disease, smoking status, income, education level and work status. The demographic information obtained from an investigator-developed subject profile.

3. Results

3.1. Descriptive Characteristics

A total number 1058 completed the questioners. The analysis of demographic information showed that the age of older persons ranged from 60 to 100 years with a mean of 68.0 (SD = 21.0). Of them, 54.3% (n = 574) were males and 45.7% (n = 484) were females. The majority of the participants 68.5% (n = 725) were married, and about 53.4% (n = 565) of them were not currently working. In relation to the smoking status, 25.8% (n = 774) were non-smoker, and 25.8% (n = 278) were smoker. Of the sample, 53.8% (n = 569) have comorbid diagnoses of medical diagnosis, 10.8% (n = 114) have a diagnosis of diabetes mellitus, 9.5% (n = 100) have hypertension. In addition, the analysis showed that the duration of the medical diagnosis ranged from one year to 76 years, with a mean of 17.9 (SD = 15.4).

3.2. Depression

Regarding the depressive symptoms, the analysis (**Table 1**) showed that the depressive symptoms ranged 5 - 40 with a mean of 17.9 (SD = 7.7). About 55.5% of the participants has non to slight depressive symptoms, 22% of them has mild depressive symptoms, 17.3% of them has moderate depressive symptoms, and only 5.2% of them has sever depressive symptoms. In general the result indicates slight to mild level of depression.

Life satisfaction: In regards to participant's life satisfaction level, the analysis (**Table 2**) showed that, the life satisfaction level ranged from 5 - 35 with a mean of 24.1 (SD = 5.6). In general, participants' life satisfaction scores were at moderate to high level given that the possible range of score is between 5 and 35.

Perceived social Support: Regarding participants' perception of perceived social support, the analysis (**Table 1**) showed that participants' highest perception of perceived social support was from others and family with mean scores of 22.1 (SD = 4.6) and 20.6 (SD = 4.3) respectively. However, participants had lower perception of social support from friends with mean scores of 20.0 (SD = 4.8). In general, perception of social support from family, friends and other were at the moderate level given that the possible range of score for each subscale is 4 - 28. And the median scores for all subscales were almost equal and at the moderate to high level (19 - 24). The analysis is showing that the lowest level of perception was perceived social support from friends although the scores reflecting moderate level of perception.

Psychological distress: In regards to participant's psychological distress level, the analysis (**Table 1**) showed that participants had a mean score of 39.08 (SD = 11.31) with scores ranging from 9 to 72. In general, participants' psychological distress scores were at the mild to moderate level given that possible range of scores is 9 - 72.

3.3. Differences in Depressive Symptoms in Relation to Demographic Characteristics

Regarding the relationship between demographic and personal characteristic and depressive symptoms, the

Table 1. Descriptive statistics of psychological; and social variables (N = 1058).

Variables	M	SD	Min	Max	P_{25}	P_{50}	P_{75}
Depression	17.9	7.7	5	40	11	16	22
Stress	39.1	11.3	9	72	31	39	48
Life Satisfaction	24.1	5.6	5	35	21	25	28
Social support - Family	20.6	4.6	4	28	19	21	24
Social support - Friends	20.0	4.8	4	28	16	19	23
Social support - Others	22.1	4.3	4	28	20	24	25

Table 2. Differences in psychological and social health variables related to demographic characteristics (N = 1058).

Variables	Social status		Working status		Educational status		Medical diagnosis	
	F	*p*	*F*	*p*	*F*	*p*	*F*	*p*
Depression	14.9	<0.001	10.0	<0.001	2.1	0.04	4.9	<0.001
PSS-O	7.0	<0.001	3.5	0.02	1.8	0.71	1.1	0.38
PSS-FR	2.5	0.04	3.3	0.02	1.9	0.28	0.9	0.56
PSS-FA	6.3	<0.001	2.1	0.09	1.2	0.57	0.3	0.98
Psychological distress	1.5	<0.001	2.1	0.10	3.5	<0.001	2.5	0.01
Life satisfaction	8.6	0.19	1.6	0.18	0.5	0.86	1.1	0.33

PSS-O: Perceived social support from others; PSS-FR: Perceived social support from Friends; PSS-FA: Perceived social support from family.

analysis showed that although there was a negative correlation between patients' age depressive symptoms, this relationship was not statistically significant. Regarding gender differences, the independent sample t-test was conducted to examine differences among older persons related to their gender. The analysis showed that there was a significant difference between male and female older persons in their depression score ($t = -4.40$, $p < 0.001$), with mean score of depression of males (M = 16.3, SD = 7.5) lower than the females (M = 18.3, SD = 7.8). Using ANOVA test, the analysis (**Table 2**) showed that there was a significant difference in depression level ($p < 0.05$) related to social status. Post hoc comparison (Scheffe) showed that mean score of depression of married older persons (M = 24.7, SD = 5.5) was significantly different than single (M = 22.6, SD = 9.3), divorced (M = 21.0, SD = 6.4), and widowed participants (M = 23.0, SD = 6.0). Also the analysis showed that there were a significant difference in depression related to older persons' working status ($F = 10.0$, $p < 0.05$). Post hoc comparison (Scheffe) showed that mean score of full time working (M = 15.6, SD = 7.4) was significantly different than those not working (M = 18.1, SD = 7.6), and part time working (M = 19.3, SD = 8.5) older persons.

In addition, there was a significant difference in depression related to older persons' medical diagnoses ($F = 4.9$, $p < 0.001$). Using post hoc comparison (Scheffe), the analysis showed that mean score of older persons diagnosed with cancer (M = 23.3, SD = 8.5) was significantly different than those diagnosed with diabetes (M = 16.6, SD = 6.3), hypertension (M = 14.8, SD = 5.1), and comorbid diagnoses (M = 16.8, SD = 7.8).

3.4. Bivariate Analysis

Firstly and to examine the relation between depression, perceived social support from others, friends, and family levels, psychological distress level, and life satisfaction level, Pearson coefficient (*r*) was used. The analysis results showed that the depression among participants has significant and positive association psychological distress level ($r = 0.50$, $p < 0.001$), and has significant and negative association with perceived social support from others ($r = -0.24$, $p < 0.001$), from the friends ($r = -0.19$, $p < 0.001$), and from the family ($r = -0.24$, $p < 0.001$), and life satisfaction level ($r = -0.36$, $p < 0.001$).

To examine whether stress, social support, life satisfaction, are significant predictors of depressive symptoms among controlling for the demographic and personal characteristics (age, gender, working status, marital status, medical diagnose, smoking status, and period of diagnosis), two-steps multiple hierarchical regression analysis was performed. The results (**Table 3**) showed that model 1 that contained demographics and personal cha-

Table 3. Two steps multiple hierarchal regressing depressive symptoms on stress, social support, life satisfaction, controlling for demographic and personal characteristics among older person in Jordan (N = 1058).

Variables	Model 1		Model 2	
	β	*P*-value	*β*	*P*-value
Age	−0.001	0.976	0.020	0.489
Gender	0.044	0.235	0.015	0.619
Marital status	0.095	**0.007**	0.071	0.013
Working status	−0.083	**0.022**	−0.084	0.005
Education level	−0.030	0.388	0.000	1.00
Medical diagnoses	−0.141	<0.001	−0.041	0.160
PSS-Fa			−0.043	0.715
PSS-Fr			−1.27	0.204
PSS-others			−0.36	0.721
Life satisfaction			−9.53	<0.001
Psychological distress			16.38	<0.001
R^2	0.052	<0.001	0.384	<0.001
Adjusted R^2	0.043		0.374	
R^2 *change*	--		0.332	

PSS-Fr: Perceived social support from friends; PSS-Fa: Perceived social support from family; PSS-others: Perceived social support from others.

racteristics explained 5.2% (R^2 = 0.052) of the variance in depressive symptoms. Although the R^2 was very small, the model was significant ($F_{4,1058}$ = 5.69, p < 0.001). In this model, working status, marital, and type of medical diagnosis were significant predictors of depressive symptom. After entry of stress, social support, and life satisfaction at step 2, the total variance explained by the model as a whole was 37.4% (R^2 = 0.374) and was significant ($F_{11,1058}$ = 88.16, p < 0.001). The variables in step 2 explained an additional 33.2% of variance in depressive symptoms. In Model 2, type of diagnosis was not a significant predictor of depressive symptoms as it was in model 1 while working status and marital status remain significant predictors. In addition, perceived social support total (β = −1.98, 0.016), psychological distress (β = 0.465, <0.001), and life satisfaction (β = −0.284, <0.001) were significant predictors of depressive symptoms. The results indicates that higher scores of life satisfaction, perceived social support and being actively working are protective factors against depressive symptoms. While higher score of psychological distress and being widowed or divorced are risk factors of depressive symptoms.

4. Discussion

The average global prevalence of moderate and severe impairment is about three times higher among persons aged 60 years or over than among those aged 15 - 59 years [1]. International reports sustained that older persons are at greater burden of chronic diseases and impairment, including physical and psychological disabilities, than any other age groups. Older adults with physical health conditions such as heart disease have higher rates of depression than those who are medically well [17], and conversely, untreated depression in an older persons with heart diseases can negatively affect the outcome of the physical disease [18]. Depression is considered the second reason of death among people around the world and increase among aged people [19]. This study aimed at examining psychological and socio-demographic predictors of depression among older persons in Jordan. In general, the study found that significant proportion (22%) of older persons are suffering depression, and that psychological distress and being lonely (divorced and widow) are risk factors for the development and severity of depressive feeling among older persons. Also we have found that social support, life satisfaction and being actively working are protective factors against depression. Older person also in this study reported moderate levels of psychological distress, life satisfaction and perceived social support (from family, friends and others). Few studies have addressed the psychosocial problems of older people at national level, and most of studies were not published [10] [11] [20]. The results support partially previous national reports focusing on psycholog-

ical and social wellbeing of older persons. Previous national reports asserted that the most common psychosocial problems among Jordan's older people included problems in family relationship, loneliness, anxiety and depression [10]. This partially agrees with what we have found that depression and social relationship are significant issues among older persons. However, the limited number of studies does not actually agree with results in this study. We found that older persons are slightly depressed and have moderate level of depression and life satisfaction, while in the national studies [10] [11] older persons have moderate level of depression and high level of stress.

Depression can cause great suffering and leads to impaired functioning in daily life (WHO, 2015). Unipolar depression occurs in 7% of the general elderly population and it accounts for 5.7% among over 60 year olds [19]. Symptoms of depression in older adults are often overlooked and untreated because they coincide with other problems encountered by older adults [13]. Older adults with depressive symptoms have poorer functioning compared to those with chronic medical conditions such as lung disease, hypertension or diabetes [21] [22]. Depression also increases the perception of poor health, utilization of medical services, and health care costs [19] [23]. Furthermore, over 20% of adults aged 60 and over suffer from a mental or neurological conditions and 6.6% of all disability among over 60 s is attributed to neurological and mental disorders. These disorders in the elderly population account for 17.4% of Years Lived with Disability (YLDs). Mental health problems are under-identified by health-care professionals and older people themselves, and the stigma surrounding mental illness makes people reluctant to seek help.

The results of this study had some agreement with previous international reports. Globally, regards to psychosocial predictors of depression, we found that perceived social support from family, life satisfaction, and psychological distress were significant predictors of depressive symptoms, whereas; age, gender, education level and type of medical diagnoses were not. The results support previous reports that depression is associated with number of clinical and demographic characteristic [24] [25]. One possible explanation is that patients had depressive feeling, however; they have also utilized available sources of social support and their level of life satisfaction as means to manage the negative feeling resting from depression and stress. Another explanation might be related to the inter-correlation of depressive symptoms and psychological distress and the use of social support as buffering system. According to Cohen, Gottlieb and Underwood [26], social support influences health through either the stress-buffering model or the main effect model. The main premises of the stress-buffering model is that others will provide necessary resources that may redefine the potential for harm posed by a situation and cushions one's perceived ability to cope with imposed demands, thereby preventing a particular situation from being perceived as stressful. These two models provide an explanation for how an individual's physical and mental health is maintained and promoted. The individual's social support, based on the stress buffering and main effect models, influences the individual's emotions, cognition, and behaviors, and consequently; is able to perceive risk factors and functions in a healthy way that improves their level of life satisfaction and their optimistic perspectives [27]. This may resulted in maintaining positive level of life satisfaction. One limitation for this study is that data were collected cross sectional, while a longitudinal one may allow better understanding for the factors that contribute to development of depression and provides a cumulative experience over long period of time.

5. Conclusion

The study has an implication for health professionals at the community and primary care settings. There is a need to assess and screen for psychosocial factors; stress, depression, social support, life satisfaction among older persons in their routine checkups and visits to outpatients units. There is also a need to develop large treatment trials aimed at improving quality outcomes of physical and psychosocial wellbeing in medical illnesses to prospect the cost and burden of caring of older persons. Good general health and social care are important for promoting older people's health, preventing disease and managing chronic illnesses. Effective, community-level primary mental health care for older people is crucial, and is recommended to equally focus on the long-term care of older adults suffering from mental health problems, as well as to provide caregivers with education, training and support. There is a need to initiate a national collaborative effort that aims at increasing the public awareness about the impact of aging and its association with psychological disturbances. Such a national agenda would urge building health professional capacity to manage and improve mental health of the older persons, and policy makers to create/modify laws that integrate psychological care of older persons.

References

[1] Population Reference Bureau (2010) World Population Data Sheet. PRB, Washington.

[2] National Council for Family Affairs (2008) National Strategy for Senior Citizens. http://www.ncfa.org.jo/Default.aspx?tabid=71&language=en-GB

[3] Doumit, J. and Nasser, R. (2010) Quality of Life and Wellbeing of the Elderly in Lebanese Nursing Homes. *International Journal of Health Care*, **23**, 72-93. http://dx.doi.org/10.1108/09526861011010695

[4] Sareen, J., Cox, B.J., Clara, I. and Asmundson, G. (2005) The Relationship between Anxiety Disorders and Physical Disorders in the U.S.: National Comorbidity Survey. *Depression & Anxiety*, **21**,193-202. http://dx.doi.org/10.1002/da.20072

[5] Wang, P.S., Demler, O., Olfson, M., Pincus, H.A., Wells, K.B. and Kessler, R.C. (2006) Changing Profiles of Service Sectors Used for Mental Health Care in the United States. *The American Journal of Psychiatry*, **163**, 1187-1198. http://dx.doi.org/10.1176/ajp.2006.163.7.1187

[6] Frasure-Smith, N. and Lespérance, F. (2006) Recent Evidence Linking Coronary Heart Disease and Depression. *The Canadian Journal of Psychiatry*, **51**, 730-715.

[7] Chen, P.Y. and Chang, H.C. (2012) The Coping Process of Patients with Cancer. *European Journal of Oncology Nursing*, **16**, 10-16. http://dx.doi.org/10.1016/j.ejon.2011.01.002

[8] MacDonald, B.H. (2001) Quality of Life in Cancer Care: Patients' Experiences and Nurses' Contribution. *European Journal of Oncology Nursing*, **5**, 32-41. http://dx.doi.org/10.1054/ejon.2000.0118

[9] Department of Statistics (2008) National Population Surveillance 2007/2008. Department of Surveillance, Department of Statistics, Amman, Jordan.

[10] Mahasneh, S.M. (2000) Survey of the Health of the Elderly in Jordan. *Medical Journal of Islamic Academy of Sciences*, **13**, 39-48.

[11] Shishani, K. (2007) Health and Future Needs for Elderly People within the Demographic Transfer. *Development and Population Journal*, **13**, 57-68.

[12] Arabiat, D., ALqaissi, N. and Hamdan-Mansour, A. (2011) Children's Knowledge of Their Cancer Diagnosis and Treatment: Jordanian Mothers' Perceptions and Satisfaction with the Process. *International Nursing Review*, **58**, 443-449. http://dx.doi.org/10.1111/j.1466-7657.2011.00899.x

[13] Hamdan-Mansour, A., Nawafeh, D., Hanouneh, S. and Al Omari, H. (2015) Psychosocial Aspects of Patients Diagnosed with Diabetes Mellitus Type-II in Jordan. *International Journal of Diabetes in the Developing Countries*, **36**, 65-69.

[14] Hamdan-Mansour, A., Azzeghaiby, S.N., Arabiat, D. and Al Badawi, T. (2014) Psychological and Social Health Status of Patients with Lung Diseases in Jordan. *Health*, **6**, 1143-1151. http://dx.doi.org/10.4236/health.2014.611141

[15] Hamaideh, S. and Hamdan-Mansour, A. (2014) Psychological, Cognitive, and Personal Variables That Predict College Academic Achievement among Health Sciences Students. *Nurse Education Today*, **34**, 703-708. http://dx.doi.org/10.1016/j.nedt.2013.09.010

[16] Yehia, D., Callister, L. and Hamdan-Mansour, A. (2013) Prevalence and Predictors of Postpartum Depression among Arabic Muslim Jordanian Women Serving in the Military. *Journal of Perinatal & Neonatal Nursing*, **27**, 25-33. http://dx.doi.org/10.1097/JPN.0b013e31827ed6db

[17] Al Abeiat, D., Hamdan-Mansour, A., Ghannam, B., Azzeghaiby, S.N. and Dawood, L. (2014) Psychosocial Health Status of Patients Diagnosed with Chronic Illnesses in Jordan. *Open Journal of Medical Psychology*, **3**, 281-291. http://dx.doi.org/10.4236/ojmp.2014.34029

[18] Freedland, K.E., Rich, M.W., Skala, J.A., Carney, R.M., Dávila-román, V.G. and Jaffe, A.S. (2003) Prevalence of Depression in Hospitalized Patients with Congestive Heart Failure. *Psychosomatic Medicine*, **65**, 119-128. http://dx.doi.org/10.1097/01.PSY.0000038938.67401.85

[19] World Health Organization (2015) Fact Sheet 381. September 2015. http://www.who.int/mediacentre/factsheets/fs381/en/

[20] Ghannam, B., Hamdan-Mansour, A., Arabiat, D., Azzeghaiby, S.N., Al Abeiat, D. and Al Badawi, T. (2014) Psychosocial Wellbeing of Patients Diagnosed with Coronary Artery Disease. *Psychology*, **5**, 801-807. http://dx.doi.org/10.4236/psych.2014.58091

[21] Hamdan-Mansour, A., Ghannam, B., Al Abeiat, D., Al Badawi, T., Thulthian, I. and Shamali, I. (2014) Predicting Depression among Jordanian Patients Diagnosed with Physical Illnesses. *Psychology*, **5**, 2120-2130. http://dx.doi.org/10.4236/psych.2014.519214

[22] Katon, W. (2003) Clinical and Health Services Relationships between Major Depression, Depressive Symptoms, and

General Medical Illness. *Biological Psychiatry*, **54**, 216-226. http://dx.doi.org/10.1016/S0006-3223(03)00273-7

[23] Cruice, M., Worrall, L. and Hickson, L. (2011) Reporting on Psychological Well-Being of Older Adults with Chronic Aphasia in the Context of Unaffected Peers. *Disability and Rehabilitation*, **33**, 219-228. http://dx.doi.org/10.3109/09638288.2010.503835

[24] Katon, W., Lin, E.H. and Kroenke, K. (2007) The Association of Depression and Anxiety with Medical Symptom Burden in Patients with Chronic Medical Illness. *General Hospital Psychiatry*, **29**, 147-155. http://dx.doi.org/10.1016/j.genhosppsych.2006.11.005

[25] Hamdan-Mansour, A., Constantino, R., Farrell, M., Doswell, W., Gallagher, M.E., Safadi, R., Shishani, K. and Bani-mustafa, R. (2011) Evaluating the Mental Health of Jordanian Women in Intimate Partner Abuse. *Issues in Mental Health Nursing*, **32**, 614-623. http://dx.doi.org/10.3109/01612840.2011.580494

[26] Cohen, S., Underwood, L.G. and Gottlieb, B.H. (2000) Social Relationships and Health. In: Cohen, S., Underwood, L.G. and Gottlieb, B.H., Ed., *Social Support Measurement and Intervention*: *A Guide for Health and Social Scientists*, Oxford University Press, New York, 3-25. http://dx.doi.org/10.1093/med:psych/9780195126709.003.0001

[27] Amer, N. and Hamdan-Mansour, A. (2014) Psychosocial Predictors of Suicidal Ideation among Patients Diagnosed with Chronic Illnesses in Jordan. *Issues in Mental Health Nursing*, **35**, 864-871. http://dx.doi.org/10.3109/01612840.2014.917752

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Cardiovascular Risk Assessment in the Nursing Team of a Cardiology Hospital

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Abstract

Objective: Cardiovascular diseases are the most common causes of morbidity and the leading cause of mortality in the world scenario, accounting for about 20% of all deaths in individuals over 30 years. It has attributed this to the increase in the company's exposure to risk factors. It identifies cardiovascular risk factors in the nursing team and compares the cardiovascular risk by Framingham score among professionals of middle and upper working in a referral hospital in cardiology. Method: Cross-sectional quantitative study was conducted in 2014, in a reference hospital in cardiology located in Recife/Pernambuco, Brazil. Data of cardiologic risk factors were collected from 82 nursing team members, comprised of technical, auxiliary nurses, and nurses between 30 and 74 years of age. The cardiovascular risk level was evaluated by the Framingham Score. Data were organized and analyzed by means of the SPSS, with descriptive statistics and Student-t test for the continuous variables. Results: Family history, stress and sedentary life style were the prevalent risk factors in more than half of the professionals. Only 5.23% of the technical and auxiliary nurses had a high risk score for cardiovascular event. Conclusion: The data indicates a low cardiovascular risk for these professionals and the presence of risk factors that can be modified. Health surveillance of these professionals is necessary in order to avoid a change to a risk of greater vulnerability.

Keywords

Nursing, Risk Factors, Cardiovascular Disease

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1. Introduction

Cardiovascular diseases (CVD) are the most common causes of morbidity and the leading cause of mortality in the world scenario, with about 20% of all deaths in people over 30 years [1]. In Brazil, the CVD were the main causes of mortality in 2007 with 30% of deaths [2] and in Pernambuco state there were 22,900 hospital admissions from 2008 to 2012 with this problem [3].

This fact is due to the increase in the society exposure to modifiable risk factors such as physical inactivity, smoking, obesity, stress, dyslipidemia, hypertension (SAH), diabetes. It is known that the sum of these factors has an exponential effect on the development of CVD [4] [5].

Although the causal relationship between employment status and CVD has not been well understood, there is the presence of risk factors among health professionals [6] [7]. Nursing, as a category with many professionals in health services, they are a vulnerable group for these diseases [8]. Several factors may contribute to this problem: emotional, double shifts, stay on the institutions and fragile working conditions. Also, physical inactivity and high weight are modifiable factors prevalent in this population [8] [9].

Thus, it is believed that the identification of cardiovascular risk in the nursing team can help in the indication of means and strategies to change their lifestyle and self-care. In this perspective, the objectives of this study are to identify the cardiovascular risk factors in the nursing team and compare the cardiovascular risk by Framingham Score among professionals working in a hospital reference in cardiology.

It is supposed that the environment and work processes are essential elements in the health condition of the workers, as the concept of surveillance in workers' health in the country [10]. Moreover, the relationship between health, environment and work process is an important focus of study for workers' health surveillance.

2. Method

The descriptive, exploratory, and cross-sectoral study with a quantitative approach was developed in cardiology sectors of a tertiary hospital, reference in Cardiology, located in the north of the city of Recife, Pernambuco. The population was 114 professionals composed of nurses, technicians and nursing assistants who worked in hemodynamics, coronary care unit, emergency and cardiology ward.

The sampling method was random. Inclusion criteria were professionals working for the state in the statutory regime or Consolidation of Labor Laws (CLT), having daytime work shift and having an age greater or equal to 30 years old and less than 74 years old. This last criterion was included to understand the score requirement of Framingham method that was used to assess the risk factors in this study. Professionals who were on maternity and health leave during the study period were excluded.

Six professionals refused to participate, twenty-three were working exclusively at night, two were on leave and did not have age-defined criteria. Thus, the sample consisted of 82 professionals.

The variables under study were sociodemographic characteristics and related risk factors reported in the literature, such as family history, lifestyle habits, anthropometry of clinical laboratory analysis data, and degree of risk for cardiovascular events.

The instrument used was adapted from an earlier study [11], with closed questions and divided into 6 modules: Module I—It was intended to obtain personal identification data (name, phone number, age, gender, race, marital status, academic degrees); Module II—Family history (data on family history); Module III—Life habits (experiment and/or use of tobacco and alcohol, current health problem, stress and physical inactivity); Module IV—Anthropometric data (weight, height, body mass index (BMI), abdominal circumference (AC) and blood pressure (BP); Module V—Laboratory measurements (total cholesterol, High Density Lipoproteins, HDL, Low Density Lipoproteins—LDL, cholesterol, triglycerides and blood glucose).

Module VI consisted of a specific tool for risk stratification of cardiovascular prepared according to the Framingham Score.

The Framingham Score was originated from an American population study called the Framingham study to estimate the risk of a cardiovascular event in the people, considering the sum of the individual clinical characteristics (age, total cholesterol, HDL, BP, diabetes and smoking), classifying the risk as low (below 10%), medium (10% to 20%) and high (above 20%) [12]. Although it has its origin in a US population, the method is recommended to use it in Brazil, due to CVD mortality in the country was similar to the countries where it has been validated and has been used in studies of various populations in the world [13].

To measure the BP, aneroid sphygmomanometers, premium brand were used, calibrated by the National In-

stitute of Metrology, Standardization and Industrial Quality (INMETRO). BP was measured after ten minutes of rest, in the sitting position, with the left arm supported at heart level. As normal SBP measurement was used 18.5 and or equal to 25 and the obesity was with a BMI greater than 30 kg/m^2 [14].

The WC was measured using an inelastic tape. The measurement was taken in the middle of the distance between the iliac crest and below the costal margin. For reference values, it was classified as increased far above 102 cm values for men and 88 cm for women [15].

Data collection took place between July and October 2014 and was carried out through interviews by the researcher with the collaboration of three residents of nursing, properly trained. After prior contact and acceptance to participate in the study, participants answered the questions of the first three modules at a scheduled time. Subsequently, they underwent measurement of BP, BMI, and WC to fill the Module IV data.

At a later stage, a collection of laboratory tests related to module V were scheduled. The professionals were instructed to perform fasting for 12 hours for measurement of blood glucose, total cholesterol, HDL, LDL, triglycerides.

This collection was performed by a hospital laboratory professional, guided by the researcher. The results of laboratory tests were monitored, with one copy for the participant and one for the researcher.

Data were tabulated and analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 Windows®. Continuous variables were expressed as means and standard deviation and evaluated using the Student t test. Categorical variables were expressed as percentages. A confidence level of 95%, the margin of error of 5% were adopted and significant values of $p < 0.05$ were considered.

The considered normal reference values were: total cholesterol (TC) < 200 mg/dl, HDL from 40 to 60 mg/dl, LDL from 100 to 129 triglycerides < 150 mg/dl and glucose 65 to 99 mg/dl. Any other result and over these values were considered abnormal.

The percentage risk of developing acute coronary disease through the score table of Framingham was calculated for all professionals as low (<10%), medium (10% to <20%) and high risk (≥20%) [5].

After obtaining the results, the professionals were guided individually about their cardiovascular risk, through nursing prescriptions and guidelines about healthy eating habits. The food that should be avoided and those healthier were indicated.

The study was approved by the Research Ethics Committee at the study site, with opinion N˚ CAAE: 32557114.7.0000.5197 and complies with Resolution 466/2012 of the National Health Council governing research involving human beings. The participants signed a free and informed consent form (TCLE) and were informed about the confidentiality of information and the relevance of the topic.

3. Results

There were 82 professional evaluated, 47.50% (n = 39) were nursing technicians, 30.50% (n = 25) were nurses and 22.00% (n = 18) were nursing assistants. For the presentation of the results found, these professionals were divided into two groups: Group A—mid-level professionals (technicians and nursing assistants/n = 57); Group B—higher-level professionals (nurses/n = 25). Data regarding socio-demographic characteristics of these groups are shown in **Table 1**. Also, the mean age was 45.77 (±7.23) years old for group A and 46.20 (±9.43) years old for the group B ($p = 0.08$).

From **Figure 1**, it can be seen that most risk factors were present in group B formed by nurses. However, the stress factors, physical inactivity, and family history have been identified in more than 50% in both groups. Stress was configured as the most prevalent risk factor among nurses (Group B), with a percentage of 90%.

Concerning clinical, laboratory and anthropometric of the groups shown in **Table 2**, the technicians and assistants (Group B) had a higher mean of BMI, diastolic blood pressure (DBP) and HDL cholesterol fraction when compared to the Group of nurses. There was a statistically significant difference between the HDL fraction between the groups ($p = 0.02$). However, the group of nurses showed levels of systolic blood pressure (SBP), Abdominal Circumference (AC) in women, blood glucose, total cholesterol (TC), LDL cholesterol and triglycerides with higher average compared to the other group. The parameters changed in both groups were AC, TC, LDL, and Triglycerides.

Although some measures are changed to values in both groups, the high cardiology risk in the risk stratification analysis according to the Framingham Score was present in only 5.23% (n = 3) of the mid-level professionals and none in the higher level professionals, predominantly with low risk (**Figure 2**).

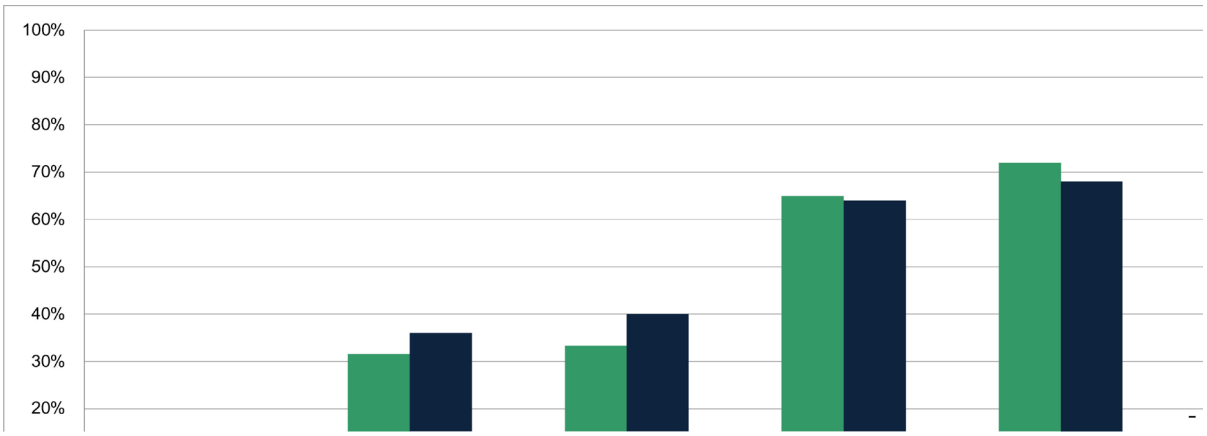
4. Discussion

The results found a predominance of females with a proportion of the characterization of the sociohistorical context of the profession, originated culture in nursing. The feminization in activities involving the treatment and care of people is considered a structural feature of the health sector activities, particularly about nursing [1] [8] [16].

As the clinical situation related to gender, studies have shown that males have a higher predisposition to de-

Table 1. Socio-demographic characteristics and work on the nursing team of a cardiology hospital, according to the professional level. Recife, PE, Brazil, 2014 (N = 82).

VARIABLES		Group A	Group B
Gender	Male	46 (80.70)	23 (92.00)
	Female	11 (19.29)	2 (8.00)
Race	White	22 (38.59)	7 (28.00)
	Brown	17 (29.82)	14 (56.00)
	Black	14 (24.56)	3 (12.00)
	Mulatto	3 (5.26)	1 (4.00)
	Indigenous	1 (1.75)	0 (0.00)
Marital status	Married	22 (38.59)	15 (60.00)
	Single	16 (28.07)	3 (12.00)
	Divorced	10 (17.54)	6 (24.00)
	Stable union	8 (14.03)	1 (4.00)
	Widow	1 (1.75)	0 (0.00)
Family income monthly	1 to 3 minimum wage*	33 (57.89)	1 (4.00)
	3 to 5 minimum wage	24 (42.10)	24 (96.00)
Children	Yes	41 (71.92)	18 (72.00)
	No	16 (28.07)	7 (28.00)
Working area	Infirmary	23 (40.35)	8 (32.00)
	Coronary unit	17 (29.82)	9 (36.00)
	Emergency Cardiology	13 (22.80)	6 (24.00)
	Hemodynamics	4 (7.01)	2 (8.00)



*Group A – mid-level professional (n = 57); † Group B - higher level professional (n=25). 1-Tobacco; 2- Obesity; 3-Overweight; 4-Family Background; 5- Physical inactivity; 6- Stress

Figure 1. Prevalence of the main cardiovascular risk factors in the nursing staff of a cardiology hospital, according to the professional level. Recife, Brazil, 2014 (n=82).

Table 2. Clinical, laboratory and anthropometric characteristics of the nursing staff of a cardiology hospital, according to professional category. Recife/PE, Brazil, 2014 (n = 82).

Variables	Reference values	Group A	Group B	P
SBP	<130 mmHg	119.52 ± 15.12	118.92 ± 10.45	0.14
DBP[†]	<85 mmHg	71.89 ± 14.65	74.48 ± 8.65	0.34
BMI[‡]	18.5 a 25kg/m^2	25.55 ± 4.53	28.86 ± 5.04	0.65
AC[§]				0.36
Male	≤94 cm	95.80 ± 6.44	98.00 ± 12.72	
Female	≤80 cm	98.89 ± 9.18	85.90 ± 3.60	
Glycemia	65 a 99 mg/dL	98.98 ± 28.92	89.64 ± 9,19	0.08
Total Cholesterol	200 mg/dL	210.45 ± 43.33	188.40 ± 35.66	0.50
HDL//	40 - 60 mg/dL	53.52 ± 11.36	55.56 ± 7.63	0.02
LDL[¶]	100 - 129 mg/dL	131.10 ± 41.80	116.96 ± 29.42	0.13
Triglicerídeos	<150 mg/dL	129.13 ± 60.20	110.88 ± 42.63	0.05

[*]SBP—Systolic Blood Pressure; [†]DBP—Diastolic Blood Pressure; [‡]BMI—Body Mass Index; [§]CA—Abdominal Circumference; //HDL—High-Density Lipoproteins; [¶]LDL—Low-Density Lipoproteins.

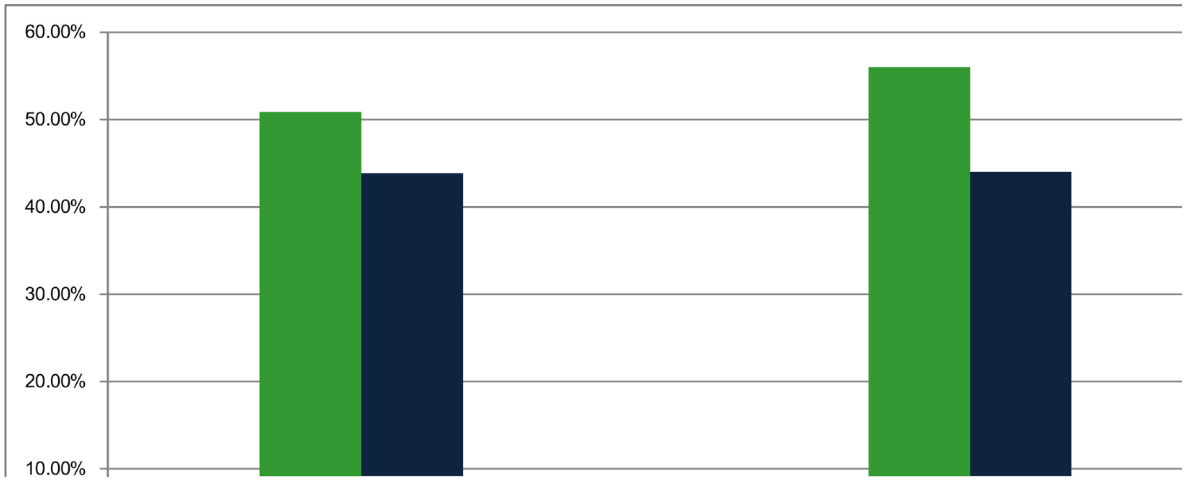


Figure 2. Stratification of cardiovascular risk estimated by the Framingham Score in the nursing staff of a cardiology hospital, according to professional category. Recife/PE, Brazil, 2014 (n = 82).

velop heart disease. Although, other studies highlight that there is an increased risk for post-menopausal women due to hormonal fluctuations to which they are exposed during this period [1]-[9].

There was a predominance of mid-level professionals, especially in the category of nursing staff due to the higher amount of the team belong to this category. Data from the Federal Nursing Council revealed that in 2010, there were 19.8% nurses, 43.2% nursing technicians, and 36.8% nursing assistants, registered with the largest amount of mid-level professionals [16].

Regarding the age, the data showed that both mid-level or higher level professionals had an average age of 46 years old. It is known that advancing age by itself, increases the risk of developing CVD and should not be viewed solely as a purely biological factor, deserving more effective preventive and educational measures for the factors that can be modified [9].

Previous studies indicate that the risk of CVD is doubled across the years of the individual, due to longer exposure to risk factors. Advancing age is a marker of some atherosclerotic plaques. The greater the amount, the greater the risk of ischemic cardiovascular disease [17] [18].

Among the Cardiovascular Risk Factors, it was noticed that most of the subjects had family history who were sedentary and non-smokers, corroborating the authors [9] when referring to the prevalence of these risk factors

in the population, in addition to a high weight [9].

Still on the CRF on the level of stress, most of the nursing staff had a moderate level of stress, but there was a higher prevalence in the group of nurses. Similar results were found in a study conducted in hospitals of the state of Paraná Western region which showed nurses with an average stress level [19].

Findings in the literature show that this fact can be attributed to unhealthy working conditions, domestic overhead and monthly income, in addition to activities that require greater responsibility. Nurses perform management activities with the planning of nursing care, personal management, the prescription of nursing care assuming all the greater technical complexity of care and direction of nursing services [20] [21].

Regarding the clinical characteristics and modifiable risk factors among mid-level and higher professionals, the findings showed that for the BP, professionals had an average of SBP and DBP, normotensive in both groups, not consistent with data presented in a study revealing a high prevalence of hypertension in nurses [22].

However, in the BMI, average above the recommended by ABESO with overweight and obesity were more prevalent in higher level professionals, contrasting results found in the study conducted at the University Hospital of the Federal University of Santa Maria who showed no statistically significant difference between nursing professionals [23].

According to the Brazilian Association for Study of Obesity (ABESO), BMI is a good indicator, but not totally related to body fat, because it has some limitations, such as it does not distinguish between fat mass of lean mass, it does not necessarily reflect the distribution of body fat, and it does not necessarily indicate the same level of fat in different populations. Nevertheless, the combination of BMI and fat distribution measures can help solving some problems of using only the BMI [15].

Therefore, research on WC was also conducted, which showed that both groups presented with threshold values when considering the standard deviation, becoming problematic for the existing potential risk. However, the average level of female professionals showed a high average in this measurement [15].

Studies show the need to adhere to preventive measures for the control of obesity, overweight, and reduced BMI because the fat deposits in the abdomen was a strong predictor for CVD. To achieve this goal, it is necessary to strike a balance in eating habits continuously to achieve success, and the acquisition of modest interventions in lifestyle to reduce cardiovascular risk [9]-[24].

On glycemic variables, the HDL fraction, and triglycerides, results showed levels within normal parameters in both groups. However, the evaluation of TC and LDL showed that most of the mid-level professionals presented above normal levels, while most of the higher-level results were within the limits. This may be related to socioeconomic factors such as income and education. By having, in general, monthly income below the higher-level professionals, nursing technicians, and assistants often need to work in two or more institutions to meet their daily needs, thus causing acquisition of bad eating habits or inferior quality, and not engaging in physical activity [25].

Thus, these factors had a significant correlation for CVD, corroborating similar study conducted in the city of Juazeiro do Norte/CE [11].

As for risk stratification by the Framingham Score, a low risk was observed for most professionals, both mid-level as higher. However, most individuals considered at risk for ten years may change the score to a high risk over a lifetime. This can occur, especially if some risk factors existing today, become sets, as shown by the Brazilian guideline of dyslipidemia and prevention of atherosclerosis; that is the cardiovascular risk is dynamic if preventive measures are not adopted in daily life [15]-[26].

The current discussion on the impact of CVD and its risk factors supports this study because they are situations to which workers are likely, whether at work, for food education, and in leisure. They are typical circumstances of time in which the practicality, versatility, and pragmatism prevail, mainly driven by the new conditions of work abilities [11] [27] [28].

5. Conclusions

The study reveals the need for preventive strategies and healthy habits need to be incorporated into the development policy of human resources in the hospital to implement the health surveillance of these workers and to encourage self-care.

It is found that a sedentary lifestyle and family histories are risk factors most prevalent in mid-level nursing professionals and smoking, obesity and overweight are more prevalent in the group of higher-level professionals.

Although most professionals in this study, both of the mid and higher level, be at low risk for a future cardiovascular injury, there is a significant quantitative with medium risk.

Thus, the results indicate the need for preventive strategies and healthy habits to be incorporated into the development policy of human resources in the hospital to implement the health surveillance of these workers and to encourage self-care. Professionals as entrepreneurs of their well-being may carry specific group changes to meet the demands of their working environment.

Therefore, it is suggested a partnership between those involved in the care and management for the construction of environments in service for the workplace exercise to encourage professionals to this habit as a way to reduce a possible cardiovascular event. Also, there is the importance of an active continuing education within the workplace to discuss with the team on the theme showing the need to adhere to reducing actions of existing or future risk for cardiovascular disease.

It must be mentioned that this study focuses on the cardiovascular risk factors in its relationship with the professional work context. However, it does not evaluate other factors that may also be associated with this vulnerability, as the existence of other jobs, the level of satisfaction with work, family demands, among others, which can be configured as a limitation of the study. More comprehensive studies will further elucidate the relationship between health professionals and the cardiology hospital setting.

References

[1] Mansur, A.P. and Favarato, D. (2012) Mortality from Cardiovascular Diseases in Brazil and in the Metropolitan Region of São Paulo: Update 2011. *Arquivos Brasileiros de Cardiologia*, **99**, 755-761. http://dx.doi.org/10.1590/S0066-782X2012005000061

[2] Goulart, F.A.A. (2011) Chronic Non-Communicable Diseases: Control Strategies and Challenges and to the Health System. Ministry of Health, Brasilia.

[3] Mendonça, S.S. and Albuquerque, E.C. (2014) Profile of Hospitalizations for Sensitive Conditions Primary Care in Pernambuco, 2008 to 2012. *Epidemiologia e Serviços de Saúde*, **3**, 463-74.

[4] Martins, L.N., Souza, L.S., Silva, C.S., Machado, R.S., Silva, C.E.F. and Vilagra, M.M. (2011) Prevalence of Cardiovascular Risk Factors in Adults Admitted to the Chest Pain Unit in Vassouras, RJ. *Revista Brasileira de Cardiologia Invasiva*, **24**, 299-307.

[5] Cavagiono, L. and Pierin, A.M.G. (2012) Cardiovascular Risk in Health Professional Pre-Hospital Care Services. *Revista da Escola de Enfermagem da USP*, **46**, 395-493.

[6] Keys, C.S., Piglet, M.P.C., Braga Junior-ACR and Sirino, A.C.A. (2015) Identification of Risk Factors for Cardiovascular Disease among Health Professionals. *Arq. Ciênc. Health*, **22**, 39-47.

[7] Hwang, W.J. and Hong, O. (2012) Work-Related Cardiovascular Disease Risk Factors Using the Socioecological Approach: Implications for Practice and Research. *European Journal of Cardiovascular Nursing*, **11**, 114-126. http://dx.doi.org/10.1177/1474515111430890

[8] Oliveira, A.S.S. (2011) Quality of Life and Cardiovascular Risk Factors Modifiable Nurses in Family Health Strategy. Dissertation, State University of Ceará, Fortaleza.

[9] Magellan, F.J., Mendonça, L.B.A., Rebouças, C.B.A., Lima, F.E.T., Custódio, I.L. and Oliveira, S.C. (2014) Risk Factors for Cardiovascular Disease among Nursing Professionals: Health Promotion Strategies. *Revista Brasileira de Enfermagem*, **67**, 394-400.

[10] Brazil. Ministry of Health.Protocol No. 008/2011 (2011) Establishes the Guidelines of the National Policy of Promoting Health of the Health System Employee—SUS. Ministry of Health, Brasilia.

[11] Gomes, E.B. (2010) Analysis of Cardiovascular Risk in Young Adults of School Juazeiro of Ceara North. Dissertation, State University of Ceará/UEC, Ceará.

[12] Dawber, T.R. (1980) The Framingham Study. The Epidemiologic of Atherosclerotic Disease. Harvard University Press, Cambridge. http://dx.doi.org/10.4159/harvard.9780674492097

[13] Petterle, W.C. and Polanczyk, C.A. (2011) Critical Evaluation of Risk Scores. *Rev Soc Cardiol Rio Gd South*, **19**, 1-6.

[14] Brazilian Cardiology Society, Brazilian Hypertension Society, Brazilian Society of Nephrology (2010) VI Brazilian Guidelines on Hypertension. *Arquivos Brasileiros de Cardiologia*, **95**, 1-51.

[15] Brazilian Association for the Study of Obesity and Metabolic Syndrome—ABESO (2009) Brazilian Guidelines on Obesity. 3rd Edition, AC Pharmaceuticals, Itapev.

[16] Machado, M.H., Vieira, A.L.S. and Oliveira, E. (2012) Construindo o perfil da enfermagem. *Enfermagem em Foco*, **3**, 119-122.

[17] Kalaycıoğlu, G.T., Ayka, B.C., Boyaci, F., Turhan, T. and Gül, I. (2014) Value of Coronary Calcium Score to Predict the Severity or Complexity of Coronary Artery Disease. *Arquivos Brasileiros De Cardiologia*, **102**, 120-127.

[18] Muniz, L.C., Schneider, B.C., Silva, I.C.M., Matijasevich, A. and Santos, I.S. (2012) Accumulated Behavioral Risk Factors for Cardiovascular Diseases in Southern Brazil. *Revista de Saúde Pública*, **46**, 534-542. http://dx.doi.org/10.1590/S0034-89102012005000021

[19] Freire, C.M.V. (2012) Cardiovascular Risk Markers: A Lot of Information and Uncertainty. *Revista Brasileira Ecocardiogr Imagem Cardiovasc*, **25**, 260-261.

[20] Inoue, K., Versa, G.L.G., Murassak, A.C.Y., Melo, W.A. and Matsuda, L.M. (2013) Occupational Stress in Intensive Care Nurses Who Provide Direct Care to Critical Patients. *Revista Brasileira de Enfermagem*, **66**, 722-729. http://dx.doi.org/10.1590/S0034-71672013000500013

[21] Costa, D.T. and Martins, C.M.F. (2011) Stress in Nursing Professionals: Impact of the Conflict in the Group and Medical Power. *Revista da Escola de Enfermagem da USP*, **45**, 1191-1198.

[22] Souza, I.S.N., Silva, F.J., Gomes, R.L.V. and Frazão, I.S. (2013) Stressful Situations Work of Nurses at a School Hospital. *Revista de Enfermagem da UFSM*, **3**, 287-295.

[23] Custódio, I.L., Lima, F.E.T., Almeida, M.I., Silva, L.F. and Monteiro, A.R.M. (2011) Socio-Demographic and Clinical Profile of a Nursing Team Carries Hypertension. *Revista Brasileira de Enfermagem*, **64**, 18-24. http://dx.doi.org/10.1590/S0034-71672011000100003

[24] Toledo, M.T.T., Abreu, M.N. and Lopes, A.C.S. (2013) Adherence to Healthy Lifestyles through Counseling by Health Professionals. *Revista de Saúde Pública*, **47**, 540-548. http://dx.doi.org/10.1590/S0034-8910.2013047003936

[25] Pires, C.G.S. (2013) Cardiovascular Risk Factors among Student (the) Nursing the First and Last School Years. Thesis, School of Nursing of the Federal University of Bahia, Salvador.

[26] Mafra, F. and Oliveira, H. (2008) Evaluation of Cardiovascular Risk-Methodologies and Their Implications for Clinical Practice. *Rev Port Clin General*, **24**, 391-400.

[27] Garden, T.H., Souza, A.L.L., Povoa, T.R., Barroso, W.S., Chinem, B. and Garden, P.C.V. (2014) Comparison of Cardiovascular Risk Factors in Different Areas in Health Twenty Years Interval. *Arquivos Brasileiros de Cardiologia*, **103**, 493-501.

[28] Nobre, M.R.C., Domingues, R.Z.L., Silva, R., Colugnati, F.A.B. and Taddei, A.A.C.T. (2006) Prevalence of Overweight, Obesity and Lifestyle Associated with Cardiovascular Risk in Primary School Students. *Revista da Associação Médica Brasileira*, **52**, 118-124. http://dx.doi.org/10.1590/S0104-42302006000200023

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Illness Perception, Treatment Adherence and Coping in Persons with Coronary Artery Disease Undergoing Angioplasty

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Abstract

Background and Objective: Coronary artery disease (CAD) is the leading cause of sudden death. In this article, we compared patients' illness perception (IP), treatment adherence and coping mechanisms of patients undergoing percutaneous transluminal coronary angioplasty (PTCA). Methods: In this descriptive, prospective observational study IP, treatment adherence and coping of 140 patients were evaluated pre-PTCA, at the time of hospital discharge and 1 to 3 months post-PTCA by Illness Perception Questionnaire, Morisky Treatment Adherence and Carver's brief COPE questionnaires. Results: 1 - 3 months post-PTCA, all dimensions of IP changed significantly except personal and treatment control. Adherence scores decreased simultaneously. With respect to coping mechanisms, all increased except behavioral disengagement, emotional support, instrumental support and religion which decreased significantly post-PTCA. Conclusions: In Overall, an improved IP and increased use of controllable causal attributions led to an increase in medication adherence and adaptive coping strategies. Post-treatment health behaviors are predictable by assessing patients' illness-related beliefs beforehand.

Keywords

Illness Perception, Adherence, Coping, Percutaneous Transluminal Coronary Angioplasty (PTCA), Coronary Artery Disease (CAD)

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1. Introduction

Coronary artery disease (CAD) is the leading cause of sudden death in the Iranian population [1] and worldwide [2]. Treatment of CAD includes medical treatment, percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass graft [3], the most common of which is PTCA [4] [5]. An individual's illness perception (IP) is their belief and expectation about the illness and is a major factor predicting their active engagement in therapy, and resulting outcomes. IP influences individuals' emotional responses to illness and their coping behavior, such as adherence to treatment [6] [7]. It is central to Self-Regulation Theory, which postulates that IP determines a person's appraisal of an illness situation and health behavior [4] [8]. According to the common-sense model of illness, patients respond to illness by forming cognitive and emotional representations of illness that influence their coping and health behavior, such as adherence [9]. Cognitive representations determine patients' emotional responses and their effort for adaptation to illness [10].

To date, studies about IP of patients undergoing PTCA have focused on patients' perceptions on a superficial level [4], or surveyed IP in a single phase only [11]. In addition, previous studies have not considered the relationship between IP and health behaviors. The aim of this study is to compare IP dimensions thoroughly, contrary to previous ones, treatment adherence and coping mechanisms of patients with CAD, before and after they undergo PTCA.

2. Methods

2.1. Study Design

Data were collected for this descriptive, prospective observational study between January and July 2015. Patients admitted to the ward one day prior to elective PTCA and who met the inclusion criteria were invited to participate in the study. Following receipt of informed consent and prior to PTCA, participants completed a questionnaire package which at the initial data collection time-point also included a demographic questionnaire. Additional information regarding medical history, number of diseased coronary vessels, stent deployment and whether or not PTCA was successful, was extracted from medical records. Participants completed the same questionnaire package post PTCA (at discharge) and one or three months later (at the cardiologist's office or heart clinic). The study conformed to the principles outlined in the Declaration of Helsinki and was approved by the ethics committee of the University of Medical Sciences (5/4/828).

2.2. Sample

A total of 155 patients who met the study inclusion criteria were selected by convenience sampling. Patients were approached and provided with written and verbal information about the study. Patients were deemed eligible for inclusion if they: had a confirmed angiographic diagnosis of coronary heart disease and were waiting for elective PTCA with or without stent insertion, were more than 18 years of age and, were willing to participate in the study. Participants were excluded from the study if they had a history of a psychiatric disorder, major medical problems such as cancer, chronic renal failure, etc. or if their PTCA was unsuccessful. The sample size was calculated by the pilot study with G Power software (v 3.1.4; Heinrich-Heine-Universität Düsseldorf).

2.3. Data Collection Instruments

The following instruments were used to collect data at three time-points: pre-PTCA, post PTCA at discharge and post-PTCA 1 or 3 months later. Content validity of the questionnaires was confirmed using feedback from expert nurses', cardiologists' and psychologists'. All three instruments have been described as demonstrating good levels of both internal consistency (Cronbach's alpha) and consistency (test–retest reliability); reliability coefficients for the questionnaires were >0.78.

The revised illness perception questionnaire (*IPQ-R*). IP, as the main domain of the self-regulation model formulated by Leventhal *et al*. (1980), consists of eight components which includes: (a) disease identity (the name and symptoms that the patient identifies as part of the illness); (b) timeline (how long the patient thinks it will last); (c) perceived consequences of the illness on the patient's life; (d) the amount of control the patient perceives they have over the illness; (e) causal attribution (the cause of the illness) [4] [9]; (f) illness coherence (how well the patient feels they understand the illness); (g) perception of treatment control (how much treatment can help to control the illness) and (h) the emotional representations (how much patients are emotionally af-

fected by the illness) [9]. IP not only determines coping responses, but is also directly related to outcomes such as treatment adherence. Patients set their IP as a basis for coping with illness according to Leventhal's *et al*. (1980) theory [12]. In order to prevent the reappearance of symptoms, even after treatment, coping with the illness and adhering to medical advice is essential [13].

IPQ-R [14] was used for this study as it assesses all dimensions of patients' IPs and beliefs surrounding their illness. The first part surveyed Identity and is presented in a yes-no format. The sum of the yes-rated symptoms in column two formed the illness identity subscale. High scores in this section represent strongly held beliefs about the number of symptoms attributed to the illness.

The second part of the questionnaire surveyed Timeline (acute/chronic), Consequences, Personal control, Treatment control, Illness coherence, Timeline cyclical and Emotional representations. These were rated on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree". After reverse scoring appropriate items, all scale items were summed on each particular scale. High scores on the timeline, consequences, and cyclical dimensions represent strongly held beliefs about the chronicity of the condition and the negative consequences and cyclical nature of the condition. High scores on the personal control, treatment control and coherence dimensions represent positive beliefs about the controllability of the illness and a personal understanding of the condition. The final part of the questionnaire related to casual attribution. By recoding "strongly disagree" and "disagree" to 0 and "having no idea", "agree" and "strongly agree" to 1, the percentage of each item at all three sampling time-points were calculated using descriptive statistics.

Morisky medication adherence questionnaire (*MAQ*). MAQ [15] consists of eight yes-no items that evaluate treatment adherence to medications. Scores greater than 2 demonstrate low adherence, scores of 1 or 2 demonstrate medium adherence, while a score of 0 demonstrates high adherence.

Carver's brief COPE. The brief COPE instrument [16] was designed to explore the degree to which participants utilize specific coping strategies. The instrument consists of 28 items which are rated on a four-point likert scale, ranging from 1 = I usually don't do this at all, to 4 = I usually do this a lot. Coping strategies refer to the specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events. Scales of coping strategies include: 1) self-distraction (employing strategies to divert concentration away from the condition); 2) active coping (exerting effort to remove or circumvent the stressor); 3) denial (attempt to reject the reality of the stressful event and consider how the stressor might be confronted); 4) substance use (use of alcohol and other drugs as a means of disengaging from the stressor); 5) use of emotional and instrumental support (obtaining sympathy or emotional support from someone and seeking assistance, information, or advice about what to do); 6) behavioral disengagement (giving up or withdrawing effort and the attempt to attain the goal with which the stressor is interfering); 7) venting (use of a concomitant tendency to ventilate or discharge those feelings); 8) positive reframing (changing one's view of a stressful situation in order to see it in a more positive light); 9) planning (planning one's active coping efforts); 10) humor (making jokes about the stressor); 11) acceptance (accepting the fact that the stressful event has occurred and is real); 12) religion (engaging in religious activities) and 13) self-blame (accounting him/herself culpable of the situation) [17] [16].

Two general coping strategies have been identified: (a) problem-solving strategies (efforts to do something active to alleviate these stressful circumstances and (b) emotion-focused coping strategies (involves efforts to regulate the emotional consequences of stressful or potentially stressful events). Both strategies are known as adaptive coping strategies. However, there is also a maladaptive strategy that is non-coping. This is known as avoidance (symptoms are reduced while maintaining strengthening the disorder in the short term such as behavioral disengagement). Several studies have indicated that people use all the aforementioned strategies to combat most stressful events [18] [19].

2.4. Data Analysis

Data were analyzed using SPSS version 13 by descriptive statistics, repeated measured ANOVA and Pearson correlations. Data are presented as means and standard deviations or frequencies and percentages. The level of significance was set at 0.05.

Findings

A total of 155 patients, scheduled for an elective PTCA, were recruited to the study over a seven-month period. Nine patients did not undergo PTCA as they opted for CABG or medical treatment, three refused to complete the questionnaire and three did not complete the follow-up questionnaires. From the remaining 140 participants, who comprised the study sample, 84 (60%) had stents inserted while 56 (40%) had PTCA with no stent

inserted. Less than one third of participants (n = 42) had previously experienced a cardiac event, while 25 had previously undergone PTCA (**Table 1**).

2.5. Illness Perception

Statistical analysis using repeated measures ANOVA with a Greenhouse-Geisser correction, revealed statistically significantly changes in Identity ($p < 0.001$), Timeline ($p < 0.001$), Consequences ($p = 0.015$), Illness coherence ($p = 0.007$), Timeline cyclical ($p < 0.001$) and Emotional response ($p < 0.001$). Conversely, changes in personal and treatment control were not statistically significant ($p > 0.05$). Post hoc tests using a Bonferroni correction revealed an insignificant increase ($p = 0.109$) in Identity from pre-PTCA to post PTCA at discharge (3.01 ± 1.93 vs. 3.22 ± 2.04). However, Identity increased significantly from pre-PTCA to post-PTCA 1 - 3 months later (3.58 ± 1.86) ($p = 0.002$) and from post-PTCA at discharge to post-PTCA 1 - 3 months later ($p = 0.024$).

There was an insignificant decrease ($p = 1.00$) in Timeline from pre-PTCA (16.42 ± 6.78) to post-PTCA at discharge (16.28 ± 6.40). When these results were compared with post-PTCA 1 - 3 months later (19.97 ± 6.35), Timeline increased significantly ($p < 0.001$).

With respect to Consequences, there was a sharp and significant increase from pre-PTCA to post-PTCA at discharge ($p = 0.003$), while changes post-PTCA at 1 - 3 months were not significant. Comparison between pre-PTCA and post-PTCA at discharge and post PTCA at 1 - 3 months were insignificant ($p = 0.21$ and $p = 1.00$ respectively) (**Table 2**).

Mean Illness Coherence scores increased significantly from pre-PTCA (16.06 ± 5.24) to post-PTCA at 1 - 3 months (17.46 ± 4.18) ($p = 0.013$).

There was a significant downward linear trend in mean scores of Timeline Cyclical from pre-PTCA (12.53 ± 3.52) to post PTCA at discharge (11.99 ± 3.21) and post-PTCA at 1 - 3 months (11.04 ± 3.84) ($p < 0.05$). Similarly, there was a statistically significant linear decrease in Emotional Representation mean scores from pre-PTCA (17.81 ± 5.30) to post-PTCA at discharge (17.29 ± 4.23) to post-PTCA at 1 - 3 months (16.25 ± 3.71) ($p < 0.05$).

Analyses of casual attribution demonstrated that past poor medical care, my negative mental attitude, overwork, my emotional state, alcohol, smoking/drugs and my personality scores remained unchanged statistically (**Table 3**). There was a gradual growth in mean Stress scores from pre-PTCA (3.23 ± 1.56) and post-PTCA at discharge (3.22 ± 1.64) to post-PTCA 1 - 3 months later (3.48 ± 1.33) with a statistically significant trend ($p < 0.05$) (**Table 3**). Mean Hereditary scores increased significantly across the three time points ($p < 0.05$), while mean scores of a germ or virus decreased significantly from pre-PTCA to post-PTCA at discharge and 1 - 3 months later ($p < 0.05$). Mean Diet scores changed steadily with a statistically significant upward linear trend over time from pre-PTCA to post-PTCA at discharge and 1 - 3 months later. The decrease in mean Chance or bad luck scores from pre-PTCA to post-PTCA was significant ($p = 0.008$). Environmental pollution mean scores

Table 1. Summary statistics for demographic characteristics of patients.

Characteristics of patients		% (n)
Age, mean ± SD (range)	61.01±10.7 (29-89)	
Gender	Male	52.9 (74)
	Female	47.1 (66)
Past hospital admission	Yes	60.7 (85)
	No	39.3 (55)
Past MI	Yes	30.0 (42)
	No	70.0 (98)
Past PTCA	Yes	17.9 (25)
	No	82.1 (115)
Type of angioplasty	With stent	60.0 (84)
	Without stent	40.0 (56)
Number of diseased vessel, mean ± SD (range)	2.06 ± 0.79 (1 - 3)	

Table 2. Summary statistics for illness perception dimensions, adherence and coping scales.

	Mean (SD)			F	p^a
	Pre-PTCA	Post-PTCA at discharge	Post-PTCA, 1-3 months later		
Identity	3.01 (1.93)	3.22 (2.04)	3.58 (1.86)	9.295	<0.001
Timeline	16.42 (6.78)	16.28 (6.40)	19.97 (6.35)	36.174	<0.001
Consequences	20.10 (4.30)	21.11 (3.60)	20.81 (3.57)	4.440	0.015
Personal Control	20.61 (6.13)	21.21 (5.31)	21.10 (5.11)	1.022	0.359
Treatment Control	19.66 (3.79)	20.16 (3.10)	20.01 (2.96)	1.353	0.259
Illness Coherence	16.06 (5.24)	16.51 (4.97)	17.46 (4.18)	5.154	0.007
Timeline Cyclical	12.53 (3.52)	11.99 (3.21)	11.04 (3.84)	11.222	<0.001
Emotional Representation	17.81 (5.30)	17.29 (4.23)	16.25 (3.71)	8.482	<0.001
Adherence	2.27 (1.68)	2.20 (1.59)	1.44 (0.89)	24.535	<0.001
Self-Distraction	5.83 (2.18)	5.48 (2.04)	6.21 (1.79)	7.871	0.001
Active Coping	6.03 (1.84)	6.18 (1.71)	7.06 (1.71)	16.200	<0.001
Denial	2.59 (0.93)	2.30 (0.71)	2.23 (0.63)	11.267	<0.001
Substance Use	2.16 (0.87)	2.06 (0.33)	2.19 (0.81)	4.047	0.030
Emotional Support	6.68 (1.35)	7.16 (1.24)	5.91 (1.45)	50.287	<0.001
Instrumental Support	6.58 (1.48)	7.21 (1.23)	5.99 (1.41)	38.506	<0.001
Behavioral Disengagement	3.03 (1.23)	2.66 (1.02)	2.54 (1.05)	12.567	<0.001
Venting	5.13 (1.45)	4.91 (1.09)	4.95 (0.75)	2.002	0.141
Positive Reframing	5.13 (1.58)	5.51 (1.68)	5.46 (1.63)	3.594	0.032
Planning	3.82 (1.91)	3.19 (1.50)	3.13 (1.32)	24.064	<0.001
Humor	3.52 (1.01)	3.63 (1.10)	3.97 (1.09)	10.151	<0.001
Acceptance	6.09 (1.36)	6.36 (1.13)	6.96 (1.03)	26.841	<0.001
Religion	6.68 (1.67)	6.53 (1.64)	6.38 (1.72)	4.050	0.023
Self-Blame	3.51 (1.52)	3.51 (1.52)	3.42 (1.51)	0.356	0.689

[a]*P*-value based on repeated measures ANOVA, Greenhouse-Geisser test.

Table 3. Summary statistics for casual belief of illness perception.

	Mean (SD)			F	P^a
	Pre-PTCA	Post-PTCA at discharge	Post-PTCA 1 - 3 months later		
Stress	3.23 (1.56)	3.22 (1.64)	3.48 (1.33)	7.467	0.001
Heredity	1.76 (1.22)	2.03 (1.22)	2.25 (1.31)	14.112	<0.001
Germ/virus	1.32 (0.58)	1.14 (0.41)	1.16 (0.47)	7.207	0.001
Diet	2.84 (1.67)	3.16 (1.61)	3.46 (1.35)	20.170	<0.001
Bad luck	1.86 (1.27)	1.70 (1.10)	1.58 (0.92967)	6.240	0.003
Past poor medical care	2.26 (1.56)	2.32 (1.47)	2.57 (1.45)	4.213	0.020
Environmental pollution	1.38 (0.90)	1.23 (0.57)	1.26 (0.53)	4.164	0.023
My own behavior	2.25 (1.41)	2.48 (1.50)	3.08 (1.38)	27.736	<0.001
My negative mental attitude	1.66 (1.02)	1.76 (1.06)	1.82 (1.11)	2.683	0.072
Family problems	3.03 (1.67)	3.23 (1.71)	3.36 (1.49)	5.939	0.004
Overwork	2.61 (1.68)	2.70 (1.66)	2.58 (1.58)	1.279	0.280
My emotional state	2.06 (1.43)	2.13 (1.44)	2.01 (1.24)	1.347	0.262
Aging	2.11 (1.50)	1.95 (1.41)	1.80 (1.25)	9.152	<0.001
Alcohol	1.04 (0.24)	1.00 (0.00)	1.03 (0.34)	1.168	0.301
Smoking/drugs	1.75 (1.42)	1.66 (1.35)	1.69 (1.44)	2.558	0.090
Accident/injury	1.20 (0.66)	1.13 (0.61)	1.11 (0.60)	10.610	<0.001
My personality	1.60 (0.99)	1.71 (1.21)	1.63 (1.20)	1.337	0.264
Altered immunity	1.62 (1.11)	1.43 (0.83)	1.33 (0.78)	12.374	<0.001

[a] *P*-value based on repeated measures ANOVA, Greenhouse-Geisser test.

decreased significantly from pre-PTCA to post-PTCA at discharge (p = 0.033). Mean scores of My own behavior increased significantly from pre-PTCA and post-PTCA at discharge to post-PTCA at 1 - 3 months (p < 0.001). The increasing mean scores of Family problems from pre-PTCA to post-PTCA at discharge (p = 0.030) in addition to 1 - 3 months later (p = 0.008) were significant. Mean scores of Aging decreased significantly from pre-PTCA to post-PTCA (p = 0.001).

Over time, mean scores of Accident or injury significantly decreased from pre-PTCA to post-PTCA at discharge (p = 0.004) and 1 - 3 months later (p = 0.002). Similarly, mean scores of Altered immunity significantly changed in a downward linear trend from pre-PTCA to post-PTCA at discharge (p = 0.010) and 1 - 3 months later (p < 0.001).

2.6. Adherence

Mean changes in adherence scores over time, from pre-PTCA and post-PTCA at discharge to post-PTCA 1 - 3 months later were statistically significantly ($p < 0.001$) (**Table 2**).

2.7. Coping

Self-distraction mean scores increased significantly from post-PTCA at discharge to 1 - 3 months later ($p = 0.001$) (**Table 2**). Active coping, humor and acceptance mean scores all showed an upward trend between pre-PTCA and post-PTCA at discharge to 1 - 3 months later ($p < 0.05$). Mean scores of denial and planning demonstrated a significant downward trend from pre-PTCA to post-PTCA at discharge ($p < 0.001$) to 1 - 3 months later ($p < 0.05$).

Mean substance use scores increased significantly from post-PTCA at discharge to 1 - 3 months later ($p = 0.019$). In addition, the use of emotional and instrumental support subscales, increased significantly from pre-PTCA to post-PTCA at discharge, while it decreased significantly from pre-PTCA to post-PTCA at 1 - 3 months and post-PTCA at discharge to 1 - 3 months later ($p < 0.001$).

There was a significant downward trend in mean scores of behavioral disengagement from pre-PTCA to post-PTCA at discharge ($p = 0.001$) and 1 - 3 months later ($p < 0.001$). Meanwhile, mean scores of positive reframing, increased significantly from pre-PTCA to post-PTCA at discharge ($p = 0.022$), while mean scores for religion significantly decreased from pre-PTCA to post-PTCA at 1 - 3 months ($p = 0.037$). Changes in venting and self-blame scores over time were non-significant.

3. Discussion

With the exception of personal control and treatment control, patients' IP dimensions changed significantly over time, in this observational study. Patients' adherence from pre-PTCA to post-PTCA at discharge remained unchanged while it increased from both pre-PTCA to post-PTCA at discharge to 1 - 3 months later. Meanwhile, increases in the following coping strategies were significant: self-distraction and substance use post-PTCA at discharge to 1 - 3 months later; active coping, humor and acceptance from pre-PTCA and post-PTCA at discharge to 1 - 3 months later and; positive reframing, emotional and instrumental support from pre-PTCA to post-PTCA at discharge.

Decreased scores in denial, planning and behavioral disengagement from pre-PTCA to post-PTCA at discharge and 1 - 3 months later; emotional and instrumental support from pre-PTCA and post-PTCA at discharge to 1 - 3 months later and religion from pre-PTCA to 1 - 3 months later were all significant, while venting and self-blame remained unchanged.

Increased mean score in Identity from pre-PTCA and post-PTCA at discharge to 1 - 3 months later revealed that participants experienced more symptoms 1 to 3 month's post-PTCA. This finding is inconsistent with those of Astin and Jones (2006), who reported PTCA to be an effective and curative procedure for CAD for subsiding identity scores [4]. The increase in identity scores may have occurred because patients consider PTCA to be a non-efficient treatment for their illness, just as Bowling *et al*. (2012) revealed negative attitudes toward angioplasty in their study [20].

Increased scores in Timeline from pre-PTCA and post-PTCA at discharge to 1 - 3 months later and a simultaneous decrease in Timeline cyclical scores revealed that patients believed in the chronicity of their condition contrary to pre-PTCA when they had misconceived CAD as an acute illness or one with cyclical nature. This may have resulted from an immediate relief of symptoms following PTCA. While misperceptions have im-

proved over time in this study, the reason for same is unclear. It may be due to attendance at rehabilitation clinics or follow-up sessions. These findings support those from a previous study [4] and are also consistent with studies which linked timeline misperception and poor adherence to health behaviors [21]-[23].

Increased mean consequences scores from pre-PTCA to post-PTCA at discharge indicated that participants perceived there to be more consequences of illness immediately following PTCA. This may have been due to participants experiencing the invasive procedure as painful, as for 82.1% of them it was their first PTCA experience, a finding inconsistent with Astin and Jones (2006) [4]. Moreover, in this study changes in mean Adherence scores were not significant. This may indicate that there is no link between perceived consequences and adherence to medications. A study which surveyed IPs (IP) of cardiac surgery candidates reported that IPs were not fully related to the real and objective medical condition or to the surgeons' rating of illness severity. Patients' views were largely different from their actual medical state [24]. This may provide an explanation for the increased consequences reported in this study, despite participants' medical condition being improved through PTCA.

Increased illness coherence from pre-PTCA to post-PTCA at 1 - 3 months revealed higher positive beliefs about participants' personal understanding of their condition. According to a review article by Kucukarslan (2012), IP dimensions, with the exception of illness coherence, influence medication adherence [25]. On the other hand, Fok *et al*. (2005), who explored the role of illness coherence on health related behavior, reported a positive correlation between sense of coherence, quality of life and coping abilities. Sense of coherence was found to determine positive health outcomes and successful coping [26]. Our findings are consistent with those of Fok *et al*. (2005).

Over the data collection time-points, changes in perception of treatment control and personal control were insignificant. This demonstrates that participants' views on the efficiency of their treatment in controlling their illness, in addition to their own ability to take control over their illness, remained unchanged. Although PTCA is a curative procedure for patients with CAD [5], Bowling *et al*. (2012) reported changes in treatment preferences of patients with CAD over 18 months; more negative attitudes towards PTCA were reported over time [20]. This may provide a further explanation for unchanged treatment control scores in this study.

A decrease in emotional representation over time demonstrated that patients were less affected emotionally by the illness than before. In a randomized controlled trial carried out by Broadbent *et al*. (2009), health behaviors such as exercising and returning to work were followed by improved consequences, emotional representation and treatment control, were increased [9].

More than half the participants in this study believed the greatest causes of their illness to be: stress, family problems and diet pre-PTCA; family problems, diet and stress post-PTCA at discharge; and diet, family problems, stress and my own behavior 1 - 3 months later. These factors are all classified as controllable [27]. The results of this study are therefore consistent with Roesch and Weiner's (2001) who carried out a meta-analysis on illness coping and its relationship to causal attribution in physically ill patients or patients undergoing medical procedures. Their meta-analysis revealed that controllable and unstable illness attributions were accompanied by positive psychological coping by using adaptive coping strategies. On the other hand, uncontrollable and stable causal attributions were associated with negative psychological adjustment by using Avoidance or maladaptive coping strategies [28].

Karademas *et al*. (2014) in their survey of cardiovascular patients revealed that personal control and illness coherence were mediators of the relationship between maladaptive health beliefs and coping behaviors [29]. Increases in identity, consequences, timeline and illness coherence in this study lead to an increased medical adherence and adaptive coping therefore our findings are consistent with these studies. While in other studies patients who perceived their illness to have a chronic or cyclical time course or to have severe consequences on their lives reported higher levels of disability, depressive symptoms, and lower levels of physical functioning after myocardial infarction. In other words IP is known as a predictor of the probability of experiencing complications [30] [31]. Conversely, Juergens *et al*. (2010) in their study which surveyed the relationship of IP and health related behavior revealed that illness beliefs were the strongest predictor of health related outcomes [24].

4. Conclusion

Although participants reported inaccuracies in treatment and personal control, which could influence outcomes and health behaviors, illness perceptions improved overall. Increased use of controllable causal attributions led

to increases in medication adherence and adaptive coping mechanisms. Participants, who were less emotionally affected by the illness, were more likely to adhere to medical recommendations and use adaptive coping strategies. Therefore, we purported that post treatment health behaviors were predictable by assessing patients' illness related beliefs in advance. Furthermore, the more realistic participants' perceptions are of their disease, the more they will adhere to medical orders.

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Declaration of Conflicting Interests

Conflict of interest: There was no conflict of interest.

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Human and Animal Rights and Informed Consent

The study conformed to the principles outlined in the Declaration of 1975 Helsinki and its later amendments and was approved by the ethics committee of Tabriz University of Medical Sciences (5/4/828). Informed consent was obtained from all individual participants included in the study.

References

[1] Firoozabadi, M.D., Ebadi, A., Ebadi, M., Ebadi, S. and Ahvaz, I. (2014) Prevalence Risk Factors in Three Vessel Disease Patients Candidate for Coronary-Artery Bypass Surgery. *Life Science Journal*, **11**, 67-70.

[2] Braza-Boils, A., Mari-Alexandre, J., Molina, P., Domingo, D., Abellan, Y., Sancho, J., *et al.* (2014) P62 Role of microRNAs Associated with Non-Alcoholic Fatty Liver Disease in Sudden Cardiac Death from Coronary Artery Disease. *Cardiovascular Research*, **103**, S10-S10. http://dx.doi.org/10.1093/cvr/cvu082.6

[3] Hirani, S.P., Patterson, D.L. and Newman, S.P. (2008) What Do Coronary Artery Disease Patients Think about Their Treatments? An Assessment of Patients' Treatment Representations. *Journal of Health Psychology*, **13**, 311-322. http://dx.doi.org/10.1177/1359105307088133

[4] Astin, F. and Jones, K. (2006) Changes in Patients' Illness Representations before and after Elective Percutaneous Transluminal Coronary Angioplasty. *Heart & Lung*: *The Journal of Acute and Critical Care*, **35**, 293-300. http://dx.doi.org/10.1016/j.hrtlng.2005.09.006

[5] Handler, C. and Cleman, M. (2006) Classic Papers in Coronary Angioplasty. Springer Science and Business Media. http://dx.doi.org/10.1007/1-84628-454-6

[6] Marcus, E., Garety, P., Weinman, J., Emsley, R., Dunn, G., Bebbington, P., *et al.* (2014) A Pilot Validation of a Modified Illness Perceptions Questionnaire Designed to Predict Response to Cognitive Therapy for Psychosis. *Journal of Behavior Therapy and Experimental Psychiatry*, **45**, 459-466. http://dx.doi.org/10.1016/j.jbtep.2014.06.003

[7] Petrie, K. and Weinman, J. (2006) Why Illness Perceptions Matter. *Clinical Medicine*, **6**, 536-539. http://dx.doi.org/10.7861/clinmedicine.6-6-536

[8] Diefenbach, M.A. (2007) Illness Representations. Health Behavior Constructs: Theory, Measurement & Research, Cancer Control and Population Sciences, US National Cancer Institute. http://cancercontrol.cancer.gov/brp/constructs

[9] Broadbent, E., Ellis, C.J., Thomas, J., Gamble, G. and Petrie, K.J. (2009) Further Development of an Illness Perception Intervention for Myocardial Infarction Patients: A Randomized Controlled Trial. *Journal of Psychosomatic Research*, **67**, 17-23. http://dx.doi.org/10.1016/j.jpsychores.2008.12.001

[10] Coffey, L. (2012) Goals, Adaptive Self-Regulation, and Psychosocial Adjustment to Lower Limb Amputation: A Longitudinal Study. Dublin City University, Dublin.

[11] Astin, F. and Jones. K. (2004) Heart Disease Attributions of Patients Prior to Elective Percutaneous Transluminal Coronary Angioplasty. *Journal of Cardiovascular Nursing*, **19**, 41-47. http://dx.doi.org/10.1097/00005082-200401000-00008

[12] Marks, D.F. (2002) The Health Psychology Reader. Sage.

[13] Masoudnia, E., Foroozannia, K. and Montazeri, M. (2012) Relationship between Perceived Social Support and Adhe-

rence to Medical Advices among Patients with Coronary Heart Disease after By-Pass Surgery. *Journal of Shahid Sadoughi University of Medical Sciences and Health Services*, **19**, 798-806.

[14] Moss-Morris, R., Weinman, J., Petrie, K., Horne, R., Cameron, L. and Buick, D. (2002) The Revised Illness Perception Questionnaire (IPQ-R). *Psychology and Health*, **17**, 1-16. http://dx.doi.org/10.1080/08870440290001494

[15] Morisky, D.E., Green, L.W. and Levine, D.M. (1986) Concurrent and Predictive Validity of a Self-Reported Measure of Medication Adherence. *Medical Care*, **24**, 67-74. http://dx.doi.org/10.1097/00005650-198601000-00007

[16] Carver, C.S. (1997) You Want to Measure Coping But Your Protocol Too Long: Consider the Brief Cope. *International Journal of Behavioral Medicine*, **4**, 92-100. http://dx.doi.org/10.1207/s15327558ijbm0401_6

[17] MacArthur, K.T. and Taylor, S. (2015, 2015/26/06). *UCSF Medical Center*. http://www.macses.ucsf.edu/research/psychosocial/coping.php

[18] Folkman, S. and Lazarus, R.S. (1980) An Analysis of Coping in a Middle-Aged Community Sample. *Journal of Health and Social Behavior*, **21**, 219-231. http://dx.doi.org/10.2307/2136617

[19] Goodman, B. and Ley, T. (2012) Psychology and Sociology in Nursing. SAGE, Thousand Oaks.

[20] Bowling, A., Reeves, B.C. and Rowe, G. (2012) Do Treatment Preferences for Patients with Angina Change? An 18-Month Follow-Up Study. *Health Expectations*, **15**, 351-359. http://dx.doi.org/10.1111/j.1369-7625.2011.00680.x

[21] Coutu, M.-F., Dupuis, G., D'Antono, B. and Rochon-Goyer, L. (2003) Illness Representation and Change in Dietary Habits in Hypercholesterolemic Patients. *Journal of Behavioral Medicine*, **26**, 133-152. http://dx.doi.org/10.1023/A:1023082622228

[22] Petrie, K.J., Weinman, J., Sharpe, N. and Buckley, J. (1996) Role of Patients' View of Their Illness in Predicting Return to Work and Functioning after Myocardial Infarction: Longitudinal Study. *BMJ*, **312**, 1191-1194. http://dx.doi.org/10.1136/bmj.312.7040.1191

[23] Meyer, D., Leventhal, H. and Gutmann, M. (1985) Common-Sense Models of Illness: The Example of Hypertension. *Health Psychology*, **4**, 115-135. http://dx.doi.org/10.1037/0278-6133.4.2.115

[24] Juergens, M.C., Seekatz, B., Moosdorf, R.G., Petrie, K.J. and Rief, W. (2010) Illness Beliefs before Cardiac Surgery Predict Disability, Quality of Life, and Depression 3 Months Later. *Journal of Psychosomatic Research*, **68**, 553-560. http://dx.doi.org/10.1016/j.jpsychores.2009.10.004

[25] Kucukarslan, S.N. (2012) A Review of Published Studies of Patients' Illness Perceptions and Medication Adherence: Lessons Learned and Future Directions. *Research in Social and Administrative Pharmacy*, **8**, 371-382. http://dx.doi.org/10.1016/j.sapharm.2011.09.002

[26] Fok, S.K., Chair, S.Y. and Lopez, V. (2005) Sense of Coherence, Coping and Quality of Life Following a Critical Illness. *Journal of Advanced Nursing*, **49**, 173-181. http://dx.doi.org/10.1111/j.1365-2648.2004.03277.x

[27] O'Connell, S., Smeltzer, C., Bare, B., Hinkle, J.L. and Cheever, K.H. (2010) Brunner & Suddarth's Textbook of Medical-Surgical Nursing. Vol. 1, Lippincott Williams & Wilkins, Philadelphia.

[28] Roesch, S.C. and Weiner, B. (2001) A Meta-Analytic Review of Coping with Illness: Do Causal Attributions Matter? *Journal of Psychosomatic Research*, **50**, 205-219. http://dx.doi.org/10.1016/S0022-3999(01)00188-X

[29] Karademas, E.C., Paschali, A., Hadjulis, M. and Papadimitriou, A. (2014) Maladaptive Health Beliefs, Illness-Related Self-Regulation and the Role of the Information Provided by Physicians. *Journal of Health Psychology*, **21**, 994-1003. http://dx.doi.org/10.1177/1359105314544072

[30] Cherrington, C.C., Moser, D.K., Lennie, T.A. and Kennedy, C.W. (2004) Illness Representation after Acute Myocardial Infarction: Impact on In-Hospital Recovery. *American Journal of Critical Care*, **13**, 136-145.

[31] French, D.P., Lewin, R.J., Watson, N. and Thompson, D.R. (2005) Do Illness Perceptions Predict Attendance at Cardiac Rehabilitation and Quality of Life Following Myocardial Infarction? *Journal of Psychosomatic Research*, **59**, 315-322. http://dx.doi.org/10.1016/j.jpsychores.2005.03.010

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Risk Factors for Perinatal Asphyxia in Newborns Delivered at Term

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Abstract

Perinatal asphyxia is defined as harm to the fetus or the newborn caused by hypoxia and/or ischemia of various organs with intensity to produce biochemical and/or functional changes. Understanding the risk factors for this clinical condition allows the identification of vulnerable groups, enabling an improvement in care planning in the perinatal period in neonatal intensive care units. In this sense, this research aimed to identify risk factors for perinatal asphyxia present in newborns term that showed record for this clinical condition. This was a cross-sectional, retrospective documentary, quantitative and descriptive, conducted from data from medical records of 55 infants admitted to a neonatal intensive care unit. As for maternal characteristics (78.0%) had between 16 and 35 years, only one child (53.0%) and (76.0%) had no prior history of miscarriage. As for pre-existing diseases or pregnancy (38.0%) developed by Hypertensive Pregnancy Specific disease (02.0%) were suffering from Hypertension and (02.0%) of Diabetes Mellitus. As for newborns, most infants had birth weight (43.6%) and correlation with gestational age (78.2%) compatible for good conditions of birth. Only (20.0%) of the infants had a difficult labor. It stood out although there was a slight predominance of severe asphyxia (50.9%) in the first minute and (45.5%) of the infants had record release intrauterine meconium. It was concluded that most mothers and newborns did not have risk factors for perinatal asphyxia, thus, this fact could be attributed to the structural conditions of service, especially in the care during labor, delivery and immediate assistance newborn.

Keywords

Birth at Term, Neonatal Asphyxia, Neonatal Intensive Care Units, Neonatal Nursing

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1. Introduction

Perinatal asphyxia is defined as a harm to the fetus or newborn (NB), caused by a lack of oxygen (hypoxia) and/or a lack of perfusion (ischemia) of various organs with sufficient intensity to promote changes in aerobic metabolism to anaerobic metabolism, triggering metabolic acidosis and cardiovascular decompensation, such as peripheral vasodilation and decreased cardiac output, resulting in severe fetal hypotension and reduced cerebral blood flow and consequently brain damage and organ dysfunction or fetal/neonatal death [1].

The parameter of the Apgar score is used to determine the level of birth asphyxia, evaluated in the first and fifth minutes of life, with scores ranging from zero to ten. Values obtained from four to seven in the first minute of life indicate birth asphyxia and the greater severity is between zero and three, suggestive of severe asphyxia [2].

Risk factors related to perinatal asphyxia are maternal age under 16 or over 35 years old; gestational age < 39 or >41 weeks; arterial hypertension; diabetes; use of illicit drugs and alcohol; hypertensive disorders; premature rupture of the membranes; maternal infection; decreased fetal activity; bleeding in the second or third trimester; gestational age and weight discrepancy; stillbirth or earlier neonatal; fetal malformation; lack of prenatal care; abnormal pattern of fetal heart rate; cesarean section; general anesthesia; use of forceps or vacuum extractor; hypertonic uterine; non-cephalic presentation; meconium amniotic fluid; prolapse or cord rupture; cord knot; chorioamnionitis; use of opioids 4 hours before delivery; membranes rupture > 18 hours; placental abruption; labor > 24 hours; placenta previa and second stage of labor > 2 hours [3].

Early neonatal mortality associated with perinatal asphyxia in newborns of low risk, that is, birth weight of ≥2500 g and without congenital malformations, is high in our country. Between 2005 and 2010 in Brazil, there were 5 - 6 early deaths per day of low-risk newborns from causes associated with perinatal asphyxia. Brazil has achieved the Millennium Development Goal number 4, reducing child mortality. However, neonatal mortality is still 69% of infant deaths and 76% of deaths occurred 0 - 6 days after birth. Most of these deaths occurred on the first day of life-related to conditions of birth [3].

The evaluation of risk factors for asphyxia can help identify fetuses at risk, allowing proper reference within the health system, as well as the planning of assistance in the perinatal period in neonatal intensive care units, and the team of providence specializing in neonatal resuscitation. The care given to this newborn soon after birth will have a strong influence in reducing the serious consequences resulting from asphyxiation or even full recovery of the neonate.

Given the above and based on the experience of the daily life of the neonatal intensive care unit (NICU) of a maternity hospital, it was observed that perinatal asphyxia in its different degrees contributes as an important cause of hospitalization of infants, including term and post-term newborns.

It should be noted that when the NB is coming from a pregnancy considered the low risk with adequate birth weight and birth at term; it reduces the likelihood of suffering asphyxia. Thus, the question is: What are the risk factors for perinatal asphyxia present in term newborn infants with asphyxia record in a neonatal unit?

This study aims to identify risk factors for perinatal asphyxia present in term newborn infants with asphyxia record.

This study is justified by the interest of contributing to the health professionals and program substantiating their care interventions aimed at improving the quality of perinatal care and reduced neonatal mortality by asphyxia.

2. Method

This is a cross-sectional, retrospective documentary, quantitative and descriptive, carried out in a neonatal intensive care unit (NICU) of a maternity school, a reference to pregnancy and birth high risk, in the state of Rio Grande do Norte. The study population consisted of all infants born in that maternity, admitted to the NICU with registration for perinatal asphyxia.

The data collection period was between 2011-2013, for infants who had lower Apgar scores or equal to 7 at the first and fifth minutes of life, and gestational age at 37 weeks and 41 weeks and six days. These are the criteria for inclusion in the survey. The study excluded newborns with congenital malformations and syndromes, for being configured as confounding factors for the degree of perinatal asphyxia, by conditions related to pregnancy, labor, and birth.

The sample corresponded to the medical records of newborns included in the eligibility criteria. For the sample representativeness of the analysis, sample calculation was performed with the prevalence of perinatal anoxia

of 3.67 [4] in newborns at term, with a confidence interval of 95% and sample loss of 10% needing to use a sample of 38 records. The initial quantitative sample regarding the medical records of newborns were 70 records. Of them, 15 were lost in the medical file and sector statistics (SAME). Thus, medical records of 55 infants were analyzed who were included in the final sample.

Data collection was in June and July 2015. The instrument used for data collection was built on the Neonatal Resuscitation Manual of the Brazilian Society of Pediatrics [5], which brings the risk factors for choking and composed four pieces that bring the variables to be studied: 1) maternal sociodemographic data; 2) data related to obstetric history, and pregnancy; 3) data related to labor and delivery; 4) data related to the conditions of birth and characterization of the NB.

The information collected in the study were entered into a specific database with the use of Microsoft Excel spreadsheets 2010 software, and further processed by the statistical program of free access, Statistical Package For Social Sciences (SPSS), version 20.0, and the data were analyzed using descriptive statistics using absolute and percentage frequencies.

The study was approved by the Ethics and Research Committee of the Federal University of Rio Grande do Norte, with CAAE 42792915.2.0000.5292 and obtaining the consent form of the institution.

3. Results

3.1. Maternal Risk Factors, Obstetric History and Gestational Period

Maternal characterization has a predominance of age between 16 and 35 years old (78.0%). As for pre-existing diseases or pregnancy (38.0%) developed Specific Hypertensive Pregnancy Disease (SHPD), (02.0%) were suffering from Hypertension and (02.0%) of Diabetes Mellitus. Of them, (53.0%) were mothers for the first time and (76.0%) had no prior history of miscarriage. All this is shown in **Table 1**.

In the previous delivery care (93.0%) women held prenatal care. However, (67.0%) had six or more visits. About the serology request for pregnancy, none of the women had antibodies to the human immunodeficiency virus (HIV) and only (02.2%) presented reagent test for syphilis.

It is noteworthy that none of the progenitors had stillbirth history and (89.1%) had positive Rh factor. The registration of complications during the pregnancy and puerperal period indicates that (3.6%) had placental ab-

Table 1. Maternal characterization as the obstetrical and pregnancy risk factores. Natal, RN, Brazil, 2015 (N = 55).

VARIABLES		N	%
Mothers' Age	Less than 15 years old	4	0.70
	Between 16 and 35 years old	43	78.0
	Older than 35 years old	8	15.0
Pregnancy quantity	Primiparous	29	53.0
	More than one pregnancy	26	47.0
Prior miscariages	No	42	76.0
	Yes	13	24.0
Hypertension	No	54	98.0
	Yes	1	2.0
SHPD	No	34	62.0
	Yes	21	38.0
Diabetes	No	53	96.0
	Yes	1	02.0
	Ignored	1	02.0
Oligoamnios	No	54	98.0
	Yes	1	02.0
DPP	No	53	96.0
	Yes	2	04.0

ruption (DPP) and (1.8%) oligoamnios. The obstetric data point to the mean gestational age at birth of 39 weeks and five days (SD ± one week and three days).

3.2. Risk Factors Related to Labor and Delivery

It was found that the predominant type of Cesarean delivery was (61.8%), the use of forceps was vaginally (07.3%), and the use of any depressant drug of the central nervous system was (14.5%), such as magnesium sulfate, opioids or benzodiazepines. The cephalic presentation was predominant (92.7%) as well as ruptured membranes for less than six hours or broken in the labor act (80.0%). As complications during labor and delivery, only (20.0%) of the infants had a difficult labor, were no reports of difficulty related to the service (03.6%) and (05.5%) had other events. Of the total RN, (70.9%) did not present any problem.

It is noteworthy that among caesarean deliveries (n = 34), (62.0%) were considered emergency (94.0%) and were carried out by use of spinal anesthesia.

3.3. Risk Factors Related to the Conditions of Birth and Characterization of the Newborn

The variables of interest for the study of the conditions of birth analyzing the favorable factors for perinatal asphyxia are presented in **Table 1** and **Table 2**.

As shown in **Table 1**, it is emphasized that most newborns had birth weight and correlation with gestational age matching good condition of birth and only (12.7%) were classified as macrosomia and (16.4%) as low birth weight, factors that favor the perinatal anoxia. For the presence of fetal suffering, only (09.1%) of the infants had and (45.5%) had record intrauterine meconium release.

As the level of asphyxia measured by Apgar, neonates born with Apgar 4 to 7 were considered mild to moderate asphyxia; and those born with Apgar scores of 0 to 3 as severe asphyxia. As noted in **Table 1**, it was detected that there was a slight predominance of severe asphyxia (50.9%) in the first minute, but an evolution from mild to moderate in the fifth minute (89.1%).

In the context of neonatal resuscitation, it is observed in **Table 3**, (94.5%) of the infants required resuscitation,

Table 2. Characterization of term newborn infants who suffered perinatal asphyxia, as the conditions of birth. Natal, RN, Brazil, 2015 (N = 55).

VARIABLES		N	%
Wight of the NB RN at birth	Low weight at birth (<2.500 g)	9	16.4
	Insufficient weight at birth (2.500 - 2.999 g)	15	27.3
	Normal weight at birth (3 - 3.999 g)	24	43.6
	Macrosomic (>4 g)	7	12.7
Gender	Male	37	63.3
	Female	18	32.7
Size for gestational age	Suitable for Gestational Age	43	78.2
	Big for Gestational Age	7	12.7
	Small for Gestational Age	5	09.1
Suffering fetal intrauterine	No	50	90.9
	Yes	5	09.1
Restriction of intrauterine growth	No	48	87.3
	Yes	7	12.7
Intrauterine meconium release	No	30	54.5
	Yes	25	45.5
Apgar 1st minute	Severe asphyxia	28	50.9
	Mild to moderate asphyxia	27	49.1
Apgar 5th minute	Mild to moderate asphyxia	49	89.1
	Severe asphyxia	5	10.9

Table 3. Characterization of term newborn infants who suffered perinatal asphyxia, as the behaviors in the delivery room. Natal, RN, Brazil, 2015 (N = 55).

VARIABLES		N	%
Resuscitation	Yes	52	94.5
	No	3	05.5
Ventilation use with positive pressure (PPV) and Oxygen	Yes	47	85.5
	No	8	14.5
Orotracheal intubation (EOT)	No	31	56.4
	Yes	24	43.6
Cardiac massage	No	51	92.7
	Yes	4	07.3
Use of resuscitation drugs	No	53	98.2
	Yes	1	01.8
Meconium aspiration airway	No	30	65.5
	Yes	19	34.5

most with the use of PPV with oxygen and (43.6%) required EOT. They (n = 24) (67.0%) had severe asphyxia in the 1st minute of life. Most cases did not require cardiac massage and the use of resuscitation drugs, but there was a record of meconium aspiration need for airway in (34.5%) of NB, despite having been releasing intrauterine meconium in (45.5%) cases.

4. Discussion

Maternal conditions and the period of pregnancy mainly affect neonatal mortality rates related to perinatal anoxia. Studies in Scotland and Brazil corroborate the findings in maternal age because the age group is between 16 - 34 years old and are primiparous. In this sense, although this range is considered low risk for complications during pregnancy and childbirth, it is believed that perinatal asphyxia in this segment of the population is a result of weakened actions related to monitoring of the pregnant woman hindering to detect the factors risk resulting in perinatal asphyxia [6] [7].

On this subject, another important factor is the prenatal care in the contribution of favorable perinatal outcomes. In this study, most women held prenatal with six consultations or more. Therefore, according to the health ministry, the number of consultations was considered appropriate. The presence of perinatal asphyxia, in this context, may indicate that complications during delivery would not be attributed only to prenatal care, but the care held by the hospital [8].

Regarding the type of delivery, most births occurred by cesarean delivery under spinal anesthesia, and this result is similar to a study that examined the prevalence of perinatal asphyxia in a reference maternity [4]. On the other hand, this information confronted with the findings of another study in which the perinatal asphyxia had more frequently in vaginal deliveries [9]. It is worth noting that the cesarean delivery between 37 and 39 weeks of gestation without antenatal risk factors for asphyxia, raises the chance of the need to perform resuscitation in newborns [3].

Regarding the clinical and/or obstetric complications in this study, only part of newborns released intrauterine meconium were aspirated. This situation was justified because there is meconium aspiration connector for the NB after birth and the vacuum being without working. This points the occurrence of failures in health care that provide a deficit in the quality of care in neonatal resuscitation caused by the lack of material available in the institution. Recently, the World Health Organization [10] launched a strategy for patient safety called the checklist of Safe Childbirth to reduce failures as those related to the lack of supplies available for care.

This problem is emphasized by authors attaching the lack of material and human resources as an obstacle to the proper neonatal care in the delivery room, especially in aspiration and resuscitation procedures which would be essential to minimize the consequences of perinatal asphyxia [11]. Thus, it is evident the importance of action planning, materials and care to lessen the level of perinatal asphyxia and promote the recovery of the neonate birth condition, improving the prognosis of this NB.

In this context, it is noteworthy that the occurrence of asphyxia cases in NB with normal weight and gestational age at term may also be attributed to childbirth care. This care must be based on proper care at birth, use of strategy, as the partograph to monitor the labor and adequate resuscitation for newborns asphyxiated, as identified in this study the amount of 94.5% of the NB sample required resuscitation [12].

The need for positive pressure ventilation shortly after birth and the progressive improvement without resuscitation or endotracheal intubation in this study in some newborns points to the effectiveness of a good neonatal care in the delivery room. Other studies also emphasize that a good PPV, with correct positioning of the neck, is enough to solve asphyxia [3].

Thus, Brazil has sought to qualify care to the newborn including all professionals, forming a multidisciplinary health team to participate in a co-responsible way, since the hospitalization of pregnant women, ensuring adoption of appropriate technologies, the immediate host, companion of choice, midwife, free positioning, and among others, ensuring comfort, pain relief and safety, and avoiding situations such as perinatal asphyxia [13].

Regarding gender, in this study, there was a higher prevalence of males in the occurrence of perinatal asphyxia (63.3%), a result similar to that found in a study in a NICU by searching for records [4]. However, another study showed a higher percentage to perinatal asphyxia in females [14].

Regarding the identification of asphyxia and its evolution, it was addressed in a study that the Apgar appears as an important indicator of this phenomenon. Thus, when the Apgar results in low scores, it can translate a fetal suffering and indicates that the baby suffered asphyxia, as shown in the findings of this study [15]. Moreover, the same study relates the fact that the low birth weight interferes directly in the NB compensation mechanisms, which are compromised, unlike the NB with a higher weight that can give better recovery mechanisms, despite the brain and heart diseases caused by perinatal asphyxia.

Other factors identified and related to asphyxia found in another study is the obstetric of pregnant history, as the performance of prenatal care (especially the number of consultations), the occurrence of clinical and/or obstetric complications, such as the most relevant: maternal age, premature birth, lower birth weight (<2500 g), stillbirth history, primiparity, threat of premature birth and clinical complications [1].

In this perspective, a study conducted in Sweden points to the importance of health staff have knowledge about the risk factors related to perinatal asphyxia. In the survey, it was identified relevant factors for delivery care to minimize the consequences to the newborn and the mother, standing out: maternal age, women with infertility or sterility history, diabetes, twin pregnancies, pre- and post-term pregnancy and the estimated size of the fetus. Another issue is that in cases seen all asphyxia case should be worked as a source of learning for the team, enabling a targeted assistance needs of the NB [16].

Thus, it is essential that the risk factors identified and worked can be used as elements of planning, analysis and organization for care implemented to the newborn in cases of asphyxia. It was noted cases of asphyxia related to mortality rates in different realities, which directly reflects the type of assistance to this population. Therefore, it was perceived the relevance of the study on the issue proposed as interventions to that patient, who requires specific care.

5. Conclusions

This study concludes that, about the pregnancy risk factors, mothers of term newborn infants who suffer perinatal asphyxia do not have predominantly risk factors for this condition of birth related to maternal and gestational age, the number of prenatal visits and complications during pregnancy.

With regard to labor and childbirth, it is found that most are caesarean, considered urgent, which is a risk factor for neonatal asphyxia and it is found that among the complications of this period, some are related to the service, pointing to failure in the planning of actions and materials in the care of newborns in the delivery room.

Regarding the conditions of birth of the newborn, it was found that most needed resuscitation, using PPV with O_2, but in some of the infants who showed releasing intrauterine meconium, the meconium aspiration of airways was not carried out by the lack of specific material for performing this procedure.

From the preceding, it is seen the need for adequacy of risk factors related to the occurrence of perinatal asphyxia in situations that go from the prenatal care of pregnant women, the delivery and conditions offered in health services.

In this sense, investing in training the staff to better assist the newborn at risk for neonatal asphyxia, given that complications may occur in the process, with action planning, materials, and care to lessen the level of perinatal asphyxia and ensure the rapid recovery of birth condition, improving the prognosis of the newborns who

suffer asphyxia and possible consequences arising.

It is also noted the importance of the records, as this fact corroborated to limitations found during the study, as regards the absence of some data. It is necessary to identify the main risk factors involved in the genesis of perinatal asphyxia to improve the care to be directed to newborns in their respective service units. As suggestions, it is necessary to incorporate the need for care protocols for resuscitation situations.

It is noteworthy that there is difficulty in obtaining data relating to items of education of pregnant women, HbsAg serology for cytomegalovirus, toxoplasmosis and HCV, due to the failure on medical records filling.

References

[1] Takazono, P.S. and Golin, M.O. (2013) Perinatal asphyxia: Repercussions Neurological Disorders and Early Detection. Magazine. *Neuroscience*, **21**, 108-117.

[2] International Classification of Diseases-ICD 10 (1993) ICD-10. International Classification of Diseases and Health-Related Problems SUS Department of Informatics.

[3] Almeida, M.F.B., Ginsburg, R. and Anchieta, L.M. (2016) Neonatal Resuscitation: Guidelines for Health Professionals. Brazilian Society of Pediatrics, Rio de Janeiro.

[4] Silva, D.A., Costa, R.C.C. and Gonzaga, C.I.A. (2014) Perinatal Asphyxia: Prevalence and Risk Factors in Newborns at Term. *Interdisciplinary Journal*, **7**, 134-140.

[5] Brazilian Society of Pediatrics (2015) Neonatal Resuscitation: Guidelines for Health Professionals. 5th Edition, SBP, Rio de Janeiro.

[6] Daripa, M., Caldas, H.M., Flores, L.P.O., Waldvogel, B.C., Ginsburg, R. and Almeida, M.F.B. (2013) Perinatal Asphyxia Associated with Early Neonatal Mortality: A Population Study of Preventable Deaths. *Paulista Journal of Pediatrics*, **31**, 37-45. http://dx.doi.org/10.1590/S0103-05822013000100007

[7] Sharma, V., Lakshminrusimha, S., Carrion, V. and Mathew, B. (2015) Resuscitator's Perceptions and Time for Corrective Steps Ventilation during Neonatal Resuscitation. *Resuscitation*, **91**, 63-66. http://dx.doi.org/10.1016/j.resuscitation.2015.03.008

[8] Domingues, R.M.S.M., Hartz, Z.M.A., Days, M.A.B. and Leal, M.C. (2012) Evaluation of Adequacy of Prenatal Care in the SUS in the City of Rio de Janeiro, Brazil. *Public Health Notebook*, **28**, 425-437.

[9] Cross, A.C.S. and Ceccon, M.E.J. (2010) Prevalence of Perinatal Asphyxia and Hypoxic-Ischemic Encephalopathy in Term Newborns Considering Two Diagnostic Criteria. *International Journal Human Growth and Development*, **20**, 302-316.

[10] WHO (2015) Safe Childbirth Checklist Implementation Guide: Improving the Quality of Delivery-Based Facility for Mothers and Newborns. Boston, 300.

[11] Mendonça, S.D., Medeiros, V.G.O., Souza, N.L., Silva, R.K.C. and Oliveira, S.I.M. (2015) Meconium Aspiration Syndrome: Identifying Obstetric and Neonatal Risk Situations. *Care Research Magazine Is Fundamental Online*, **7**, 2910-2918.

[12] Mmbaga, B.T., Lie, R.T., Olomi, R., Mahande, M.J., Olala, O. and Daltveit, A.J. (2012) Causes of Perinatal Death at a Tertiary Care Hospital in Northern Tanzania 2000-2010: A Study Based Registry. *Pregnancy and Childbirth*, **12**, 2-9. http://dx.doi.org/10.1186/1471-2393-12-139

[13] Lansky, S., Friche, A.A.L., Silva, A.A.M., Campos, D., Bittencourt, S.D.A., Carvalho, M.L., Frias, P.G., Cavalcante, R.R. and Cunha, A.J.L.A. (2014) Search Sunrise in Brazil: Profile of Neonatal Mortality and Evaluation of the Assistance to the Mother and Newborn. *Public Health Notebook*, **30**, 192-207.

[14] Kings, L.A., Santos, C.V., Britto, T.I., Botelho, S.M., Jesus, C.S. and Santos, W.S. (2009) Epidemiological Analysis of Perinatal Asphyxia in Newborns at the General Hospital Prado Valadadres (HGPV). *Magazine Baiana of Public Health*, **33**, 311-322.

[15] Oliveira, T.G., Freire, P.V., Moreira, F.T., Moraes, J.S.B.F., Arrelaro, R.C., Rossi, S., Ricardi, V.A., Julian Y., New, N.F. and Bertagnon, J.R.D. (2012) Score of Apgar and Neonatal Mortality in a Hospital Located in the Southern Area of São Paulo. *Einstein*, **10**, 22-28. http://dx.doi.org/10.1590/S1679-45082012000100006

[16] Berglund, S. (2011) Every Case of Asphyxia Can Be Used as a Learning Example. *Journal Perinatal Medicine*, **40**, 9-18.

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